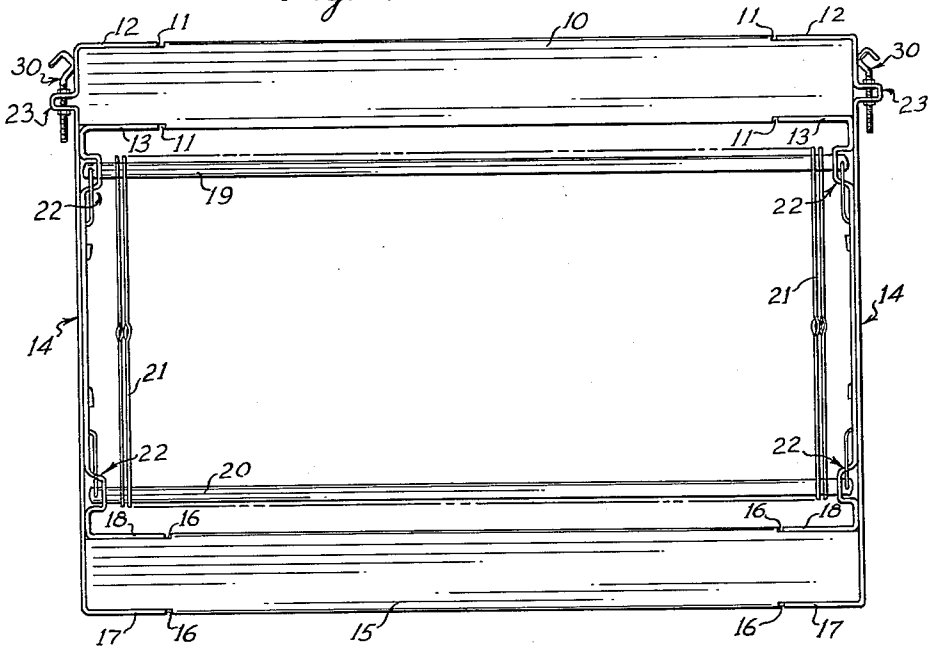
Oct. 15, 1963 R. W. RAY 3,106,942

HEDDLE FRAME

Filed April 19, 1961

Fig. 1



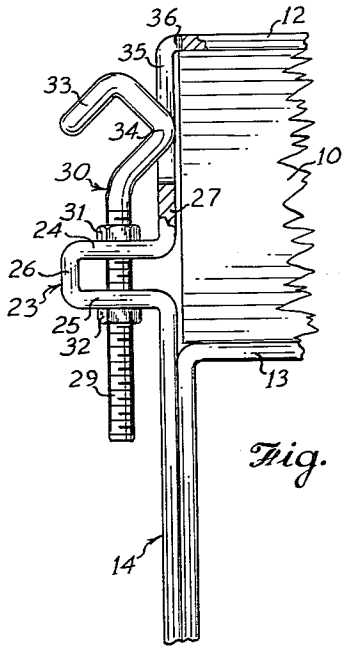


Fig. 2

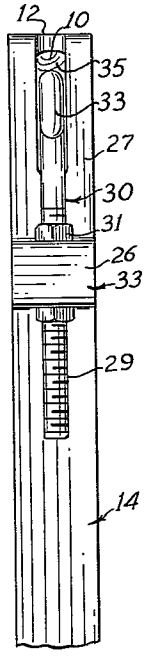


Fig. 3

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HEDDLE FRAME

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This invention relates to a heddle frame and is more particularly concerned with a means on a heddle frame for arresting the rotational tendency of the supporting hooks.

In the past, hooks have been extensively employed for connecting the heddle frames of a loom to the harnesses by means of which the frames are moved vertically at appropriate times so as to control certain warp yarns leading to the loom. With several frames being arranged in parallel planes face to face with each other, any twisting or rotation of a hook about its axis will present a danger of one hook engaging an adjacent hook.

In recent times, the hooks of certain types of frames have been moved from the central part of the frame to the ends of the frame where they have been more readily accessible, the hooks being carried by U-shaped protrusions formed in the outer frame members. In such positions, the lock nuts which retain the hooks may be vibrated sufficiently to loosen the same and permit rotation of the hooks with the resulting danger of engagement with an adjacent hook.

To obviate this problem, I have devised a heddle frame wherein the inner peripheral portions of the heads of the hooks are received within side recesses which are disposed parallel to the axis of the hooks' shanks. Thus, in essentially all operative positions of the hooks the hooks are maintained in relatively fixed, but axially adjustable, positions with the slots formed by their bights facing outwardly for ready access.

Accordingly, it is an object of the present invention to provide in a heddle frame having end hooks an efficient and effective means for maintaining the hooks in predetermined radial positions.

Another object of the present invention is to provide a loom frame having hooks which are easily connected and disconnected to their harnesses and will not readily engage other hooks of adjacent frames.

Another object of the present invention is to provide a heddle frame having end hooks which are not readily loosened or rotated by continued vibration imparted to the frame.

Another object of the present invention is to provide a heddle frame which is inexpensive to manufacture, durable in structure and efficient in operation.

Other objects, features and advantages of the present invention will become apparent from the following description when taken in conjunction with the accompanying drawings wherein like characters of reference designate corresponding parts throughout the several views and wherein:

FIG. 1 is a side elevational view of a heddle frame constructed in accordance with the present invention.

FIG. 2 is an enlarged fragmentary view of the upper left hand corner of the heddle frame illustrated in FIG. 1.

FIG. 3 is an end view of that portion of the frame illustrated in FIG. 2.

Referring now in detail to the embodiment chosen for the purpose of illustrating one form of the present invention, it being understood that in its broader aspects the present invention is not limited to the exact details herein depicted, numeral 10 denotes the top bar or rail of the heddle frame, which bar is an elongated, rectangular member preferably formed of wood. Each of the

upper and lower end portions of rail 10 are recessed at 11 to receive the outer and inner, inwardly turned opposed brackets 12 and 13 of the vertical disposed opposed end strut 14. Each end strut 14 is preferably formed of one or a plurality of flat metal bars which are rectangular in cross section.

Similarly, the bottom of lower bar or rail 15, which is substantially identical to the top bar 10, receives in its recesses 16 the outer and inner opposed brackets 17 and 18 at the lower end of end struts 14. Suitable means such as bolts (not shown) secure the brackets 12, 13, 17 and 18 in place. Thus, an open rectangular frame is provided having vertical end frames 14 and horizontal top and bottom bars joined by their ends.

Between the top rail 10 and bottom rail 15, the end struts 14 carry, in parallel relationship to top rail 10 and bottom rail 15, the heddle supporting rods or bars 19 and 20 with the heddles 21. Suitable means, indicated at numeral 22, releasably retain the ends of the heddle rods 19 and 20 in the end struts 14.

As best seen in FIGS. 2 and 3, that portion of each end strut 14 which lies between the outer and inner brackets 12 and 13 is bent outwardly, then upwardly, and then inwardly to provide an outwardly extending, horizontally disposed U-shaped protrusion or hook supporting member 23 having a pair of spaced upper and lower parallel arms 24 and 25 joined at their outer extremity by a body member or web 26.

It is now seen that the arms 24 and 25 lie parallel to and between the brackets 12 and 13, the arms 24 and 25 protruding from end strut 14 in a direction opposite to the direction of protrusion of the brackets 12 and 13. Preferably the hook supporting member 23 is located more closely to the inner bracket 13 so that that portion of end strut 14 forming the corner bar or hook arresting member 27, which extends between the inner end of upper arm 24 and the outer end of bracket 12, is relatively long.

Protruding through appropriate vertically aligned holes in arms 24 and 25 is an elongated straight cylindrical shank 29 of a harness hook, denoted generally by numeral 30. The shank 29 is provided with external threads throughout its length, the threads receiving an upper lock nut 31 which normally abuts the upper arm 24 and a lower lock nut 32 which normally abuts the lower arm 25. It will be understood that by manipulation of nuts 31 and 32, the shank 29 may be raised and lowered and locked in any predetermined axial position. The shank 29, however, at all times remains parallel to the hook arresting bar 27.

Integrally formed at the upper end of shank 29 is a hook head 33 which has an outwardly and downwardly opening slot formed by the bight of the hook head 33. As viewed in FIG. 2, the hook head 33 is relatively wide and has an innermost portion at 34 which, when shank 29 is received by hook supporting member 23, rides in a vertical, upwardly opening hook receiving slot 35 in hook arresting bar 27.

It is therefore seen that the bar 27 forms an upwardly extending slotted or bifurcated hook arresting member which is about tangential to the hook 30 and receives a portion of the hook head 33 within the slots 35 to thereby arrest any tendency of the hook 30 to rotate, the bifurcated member being about normal to the hook supporting member 23 with its slot 35 about tangential to the hook head 33.

In the present invention, for best results, certain relationships should be maintained. For example, the holes in arms 24 and 25 should be aligned about parallel to the hook arresting member 27. The inner portions 34 of head 33 should be offset from the axis of shank 29 by a distance greater than the distance from the axis

of the aligned holes in arms 24 and 25 to the outer surface of corner bar 27 and not more than the distance from the axis of the aligned holes to the end of top bar 10. Further, the width of slot 35 should be slightly greater than the width of the inner portion 34 so that this inner portion 34 may move axially therein. Also, slot 35 should be parallel to and lie in the same transverse vertical plane with the axis of the holes in arms 24 and 25.

Since the bracket 12 and the corner bar 27 are joined normal or perpendicular to each other, the upper end of slot 35 forms a U-shaped opening 36 a slight distance into the end of bracket 12. This opening 36 should terminate in about the plane of the end of top bar 10.

From the foregoing description, the operation of the present device should be apparent. When the harness hook 30 is to be installed, the lock nut 31 is threaded onto shank 29 to the position shown in the drawings. The shank 29 is then installed in the holes of arms 24 and 25. As the shank 29 is inserted therein, the head 33 is aligned with slot 35 so that the slot receives inner portion 35 therein. Thereafter, nut 25 is threaded on shank 29 and tightened in place. The receiving of inner portion 34 in slot 35 naturally positions the hook 30 facing outwardly in a position to receive the loop of the harness.

It is understood that the heddle frame described above is symmetrical and has a complementary pair of hooks 30 at the upper corner portions of struts 14, the hooks 30 being maintained facing outwardly by their associated slots 35. Therefore, harnesses (not shown) at both ends of the frame are easily connected and disconnected. Also, the height of hook 30 may be easily adjusted by manipulation of nuts 31 and 32 without rotating hook 33.

With the arrangement thus described, it is virtually impossible for the hook 30 to pivot about its axis and therefore become engaged in the next adjacent hook. It is also noted that no additional material is required to achieve this most desirable result here produced.

It will be obvious to those skilled in the art that many variations may be made in the embodiment chosen for the purpose of illustrating the present invention without departing from the scope thereof as defined by the appended claim.

I claim:

In a heddle frame of the type having parallel top and bottom rails and end struts joining the ends of said rails, said end struts each including a flat rectangular metal bar having a right angular bend for defining a corner

of said frame, a bracket integral with and extending from said corner inwardly over the end portion of one of said rails, said bracket being recessed in said one of said rails sufficiently that the outer surface of said bracket is essentially in the same plane with the outer edge of said one of said rails, and a body portion integral with and extending from said corner along the end of said one of said rails, a U-shaped outwardly extending hook supporting member spaced from said corner and integrally connected to and carried by said body, said hook supporting member having a pair of aligned holes the axis of which is parallel to the plane of said body portion, a hook carried by said hook supporting member, said hook having a shank passing through said aligned holes in said hook supporting member essentially parallel to and spaced from said body portion of said end strut, and nuts on said shank respectively above and below said holes for adjusting the position of said hook axially of said shank, said hook having a head defining an outwardly opening bight, the combination wherein the inner portion of said head of said hook is offset from the axis of said shank by a distance greater than the distance from said axis of said shank to the outer surface of said body portion of said end strut, said body being provided with an open-ended slot receiving said innermost portion of said head, said slot being slightly wider than said inner portion of said head, said slot extending from a position adjacent said hook supporting member outwardly through said corner of said end strut, said slot and said hook being disposed in a common transverse plane, said body portion being about tangential to said head, said body portion being about normal to said hook supporting member, the open end of said slot defining a U-shaped opening into said bracket, said U-shaped opening terminating in about the plane of said end of said one of certain rails and at a greater distance from the axis of said shank than the offset portion of said head.

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