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A. A. GORDON

WARP END HOLDER FOR WARP BEAMS

Filed Oct. 25, 1926

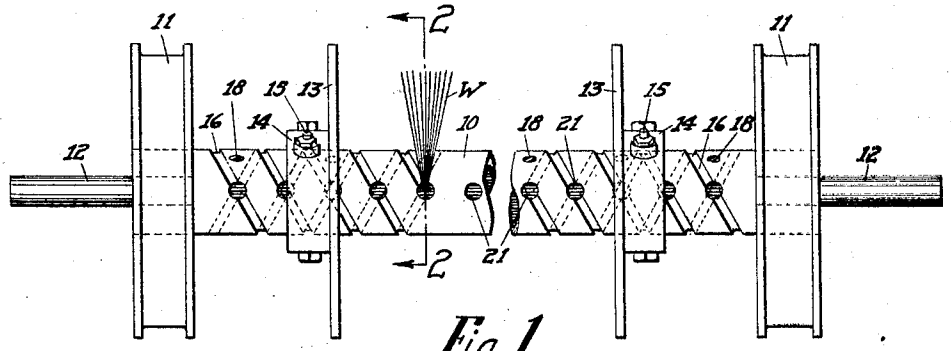


Fig 1

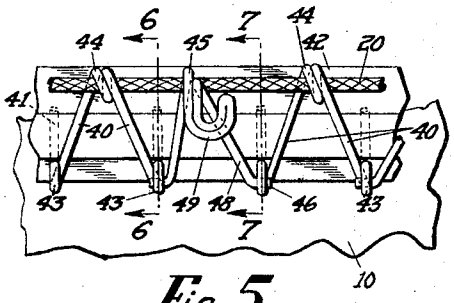


Fig 5

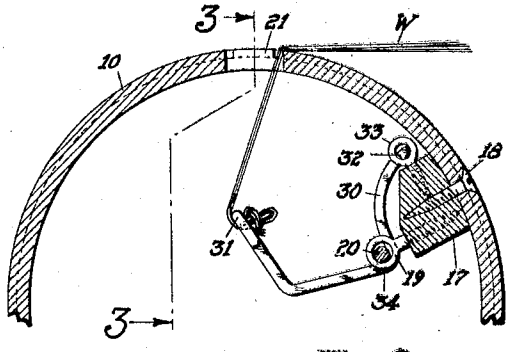


Fig 2

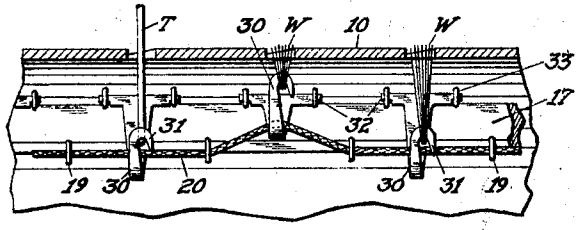


Fig 3

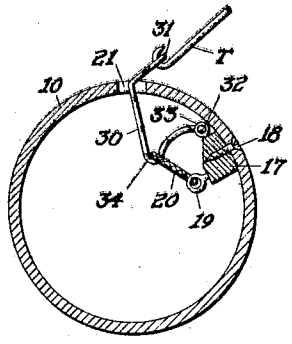


Fig 4

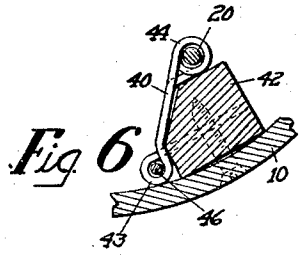


Fig 6

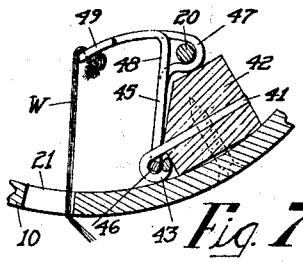


Fig 7

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UNITED STATES PATENT OFFICE.

ALBERT A. GORDON, OF WORCESTER, MASSACHUSETTS. ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

WARP-END HOLDER FOR WARP BEAMS.

Application filed October 25, 1926. Serial No. 143,978.

This invention relates to warp beams for looms and it is the principal object of the invention to provide improved means for retaining the groups of warp threads so that any inequalities resulting from the tying in of the groups may be equalized.

When a silk warp is fastened to a beam the ends are divided into groups which are secured to some part of the beam. In my co-pending application Ser. No. 137,860 I have shown a beam having a hollow barrel with holes therein through which the groups of ends pass to be tied to a flexible cord inside the barrel. The threads in said application are tied directly to the cord while a portion of the cord is projecting through one of the openings in the barrel. When the next group is tied to the cord the first group is drawn into the barrel by a motion on the part of the cord which draws the knot toward the guide or holder for the cord. If the ends have been tied too tightly and the amount of the cord extending beyond the periphery of the barrel is considerable the knot will not slip on the cord, thus preventing the complete equalizing action which is desired. It is an important object of my present invention to overcome this defect by introducing an element between the cord and the knotted warps which will overcome the friction between the fibrous cord and the warp ends.

It is a further object of my invention to provide a hollow barrel with a plurality of hooks movable in fixed planes with respect to the barrel and arranged to project through openings to facilitate the tying of the warp ends, said hooks being in engagement with the flexible cord so as to compensate for any inequalities resulting from tying of the warp ends to the hooks.

It is a still further object of my invention to provide hooks so disposed with respect to the cord in the barrel that the total amount of compensation for the various groups of warps will be greater than is possible where the warp is tied directly to the cord, the advantage resulting from the fact that the cord engages the hook between the fulcrum thereof and the point where the warp is secured thereto.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth in the claims.

In the accompanying drawings wherein I have shown two forms of hooks and guide means for the cord,

Fig. 1 is a top plan view of a beam having my invention applied thereto,

Fig. 2 is a fragmentary enlarged vertical section on line 2—2 of Fig. 1,

Fig. 3 is a detail section on line 3—3 of Fig. 2,

Fig. 4 is a section similar to Fig. 2 but on a reduced scale showing the hook projecting through the corresponding opening in the barrel of the beam,

Fig. 5 is an elevation of a portion of the wooden strip located in the barrel but having a modified form of hook and cord guide, and

Figs. 6 and 7 are detail sections on lines 6—6 and 7—7, respectively, of Fig. 5, showing two features of the modified form.

Referring to the drawings it will be seen that I have provided a hollow barrel 10 preferably metallic and having secured at each end thereof a fixed head 11 from which projects a supporting gudgeon 12. False heads 13 having hubs 14 are longitudinally adjustable along the barrel by means of screws 15 fitting spiral grooves 16.

In the preferred form of the invention as shown in Figs. 1 to 4 a wooden strip or bar 17 is secured on the interior of the barrel by means of wood screws 18 and there is located at spaced intervals along said bar a series of screw eyes 19 through which extends a flexible cord 20. The barrel is provided with a plurality of openings 21 and the eyes 19 are preferably, though not necessarily, so placed as to lie between adjacent holes 21 as shown in Fig. 3. The cord 20 may have the ends thereof secured to the end eyelets 19 by having knots tied therein. The matter thus far described may be substantially the same as set forth in my aforesaid application.

Instead of tying the warp ends W directly to the cord 20 as in my earlier construction I provide herein a plurality of hook members 30 having a hooked end 31 at one end thereof and a pair of bearing ends 32 at the other end thereof, said bearings 32 extending through rigid eyes 33 similar to the eyes 19 and mounted on the bar 17. Each hook

member 30 is formed substantially as shown in Fig. 2 with an angular portion indicated at 34 defining a notch for the cord 20. That portion of the member 30 lying between the notch 34 and the bearings 32 should be formed in a manner similar to that set forth in the drawings so that the cord will at all times be retained in the notch.

When a new warp is to be tied to the beam the threads will be separated into small groups and an appropriate tool T inserted through the first opening 21 adjacent one of the false heads 13 to engage the corresponding hook 31 and move the same to the position shown in Fig. 4, this motion being permitted by the slackness of the cord 20. The first group of warp ends W is then secured to this hook and the tool T inserted through the next opening 21 to withdraw the second hook. This motion will be accompanied by straightening out the slack of the cord for the first hook so that the latter will move into the beam to the position shown in Fig. 2. This operation is repeated until all the groups have been tied to the hooks, the slackness in the cord 20 for the last hook being taken up by a slight bending of the cord between all the eyes 19. This bending of the cord will depend upon the tightness or slackness of the various groups and will tend to equalize any unevenness in the tension of the warp threads. The hook member 30 moves in a plane fixed with respect to the beam and any longitudinal movement of the cord relatively thereto will not move the warp threads lengthwise of the barrel.

An inspection of Fig. 2 shows that the distance between the hooked end 31 and the axis of the hooked member is greater than the distance between said axis and the cord 20, so that the amount of movement of the knots in the warp thread groups is greater than the movement in the cord, and consequently the compensation for uneven tying is greater than would be the case were the ends tied directly to the cord, as in my aforesaid application.

In the modified form of the invention shown in Figs. 5, 6, and 7, there are set forth warp hooks and cord guides formed of wire. In carrying out this modification of the invention I form each cord guide 40 as shown in Figs. 5 and 6 with a pair of spaced straight ends 41 which are driven into a wooden bar 42 corresponding to bar 17, the wire being provided with loops 43 adjacent the wooden bar 42 near the point where the ends 41 enter the same, and I further provide each guide with an eye 44 to receive the cord 20.

The hook member 45 has a pair of aligned short ends 46 which pass into the adjacent eyes 42 of adjacent guide members 40 to be pivotally mounted on said guides. The intermediate portion of each of said hooks 45 is formed with a crimp as shown at 47 in Fig. 7 to receive the cord 20, and a straight part 48 on the hook member extends across the crimp to form therewith an eye for the cord. The central portion of the wire forming the hook is bent as shown at 49 in Fig. 5 into the shape of a hook to receive the warp ends.

The method of tying in the warp ends in the modified form of the invention is substantially the same as that described in connection with the preferred form, the eyes 44 being fixed and the hook member 45 moving around the eyes 43 as centers when the hook is being projected through one of the openings 21 to receive a group of warp threads.

From the foregoing it will be seen that I have provided a hollow warp beam having a flexible cord therein possessed of sufficient slackness to compensate for any unevenness which may result in the tying in of the several groups of warp ends and that I have interposed between each group and the flexible member a metallic or non-fibrous device which prevents the longitudinal movement of the flexible cord from moving the warp ends laterally against the guides for the cord. It will further be seen that I have provided a hook member movable in a plane fixed relatively to the beam and having the warp ends tied to one part thereof and being acted on at another part thereof by the cord. It will further be seen that that part of the hook member which has the warp ends secured thereto has a greater movement than the part which is in contact with the cord so as to permit a greater movement on the part of the warp ends to take up the unevenness thereof than is possible in my aforesaid application where the warps are attached directly to the cord.

Having thus described my invention it will be apparent that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention, and I do not wish to be limited to the details herein disclosed but what I claim is:

1. In a warp beam, a hollow barrel having passages through the periphery thereof for groups of warp threads, a flexible slack member extending along the interior of the barrel, and a plurality of non-fibrous guides interposed between the flexible member and the groups of warp threads, movement of the flexible member compensating for unevenness in tying the groups to the guides and the said guides preventing direct operative contact between the groups and the flexible member.

2. In a warp beam, a hollow barrel having openings therethrough for groups of warp threads, a flexible slack member extending along the interior of the beam, a plurality of spaced guides for the member, and a

non-fibrous device operatively connected to the member between adjacent guides, and movable toward and from one of the openings in the barrel and adapted to have tied thereto a group of warp ends.

3. In a warp beam, a hollow barrel having a plurality of openings in the periphery thereof, a flexible slack member extending along the interior of the barrel, a plurality of spaced guides for the flexible member, and a set of hooks pivotally mounted relatively to the barrel on the interior thereof and having operative contact with the slack flexible member and adapted to extend through the opening to have the warp ends secured thereto.

4. In a warp beam, a hollow barrel having a plurality of openings in the periphery thereof, a flexible slack member extending along the interior of the barrel, a plurality of spaced guides for the member, and a plurality of hooks each to receive a group of warp ends and each movable toward and from one of the openings in a plane fixed relatively to the barrel and each having contact with a portion of the flexible member, to the end that inequalities in the tying of the warp threads to the hooks may be compensated for by the slackness of the member.

5. In a warp beam, a hollow barrel having a plurality of openings therein, a flexible slack member extending along the interior of the barrel, a plurality of spaced guides for said member, and a plurality of pivoted hooks movable toward and from the openings and having ends to receive groups of warp threads, said hooks being formed to have contact with a portion of the flexible member at points nearer the pivots of said hooks than the points at which the warp threads are secured thereto.

6. In a warp beam, a hollow barrel having a plurality of openings therethrough, a flexible slack member extending along the interior of the barrel, and a plurality of devices to have the warp threads tied thereto, and having contact with said flexible member, said members being movable relatively to each other to take up unevenness in the tying of the groups of warp threads thereto and being limited in said relative movement by the slackness of the member, the movement of the warp ends relatively to each other being greater than the movement of the flexible member due to the slack thereof.

In testimony whereof I have hereunto affixed my signature.

ALBERT A. GORDON