

[54] **HAND LOOM**
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 [51] Int. Cl. **D03d 29/00**
 [58] Field of Search **139/29-34; 28/15**

2,582,008 1/1952 Clack..... 139/29

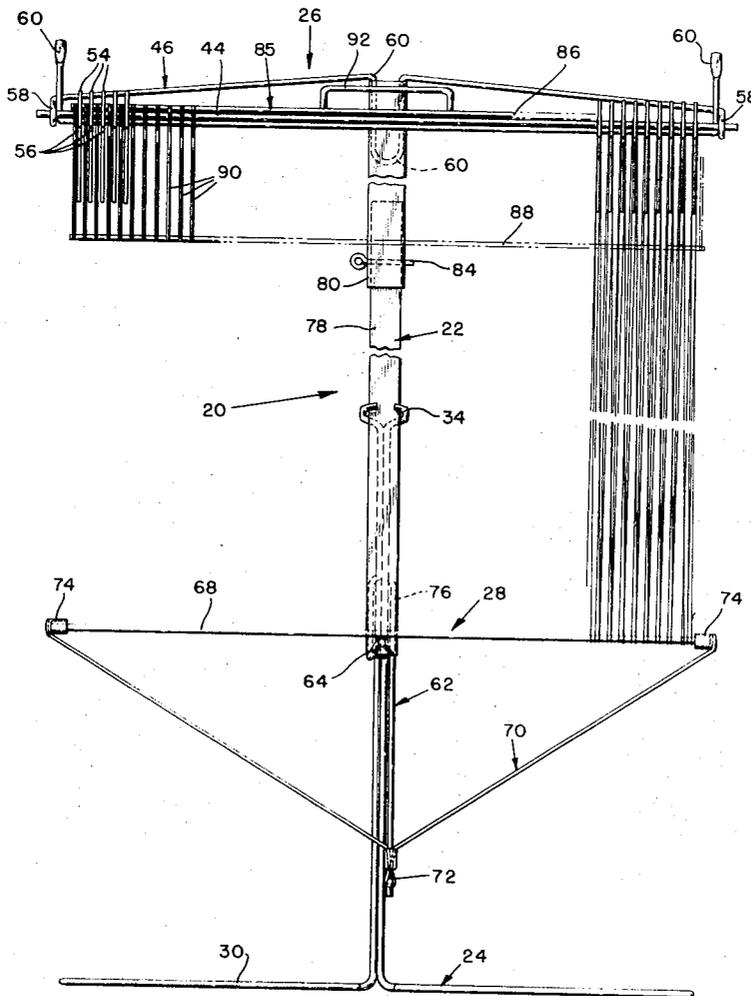
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[57] **ABSTRACT**

A hand loom having an improved upper warp retaining assembly for substantially increasing the threads per inch supported thereby and a lower warp retaining and stringing assembly for automatically adjusting the tension applied to the warp and for facilitating stringing of the warp threads. A warp base stand supports the hand loom support frame in an upright position. Templates are adapted to be releasably secured to the beater or the upper warp retaining assembly for varying the warp thread shed combinations giving the loom the advantage of multi-harness weaving.

15 Claims, 14 Drawing Figures

[56] **References Cited**
UNITED STATES PATENTS
 3,347,281 10/1967 Stars 139/29
 2,077,532 4/1937 Rossiter 139/33



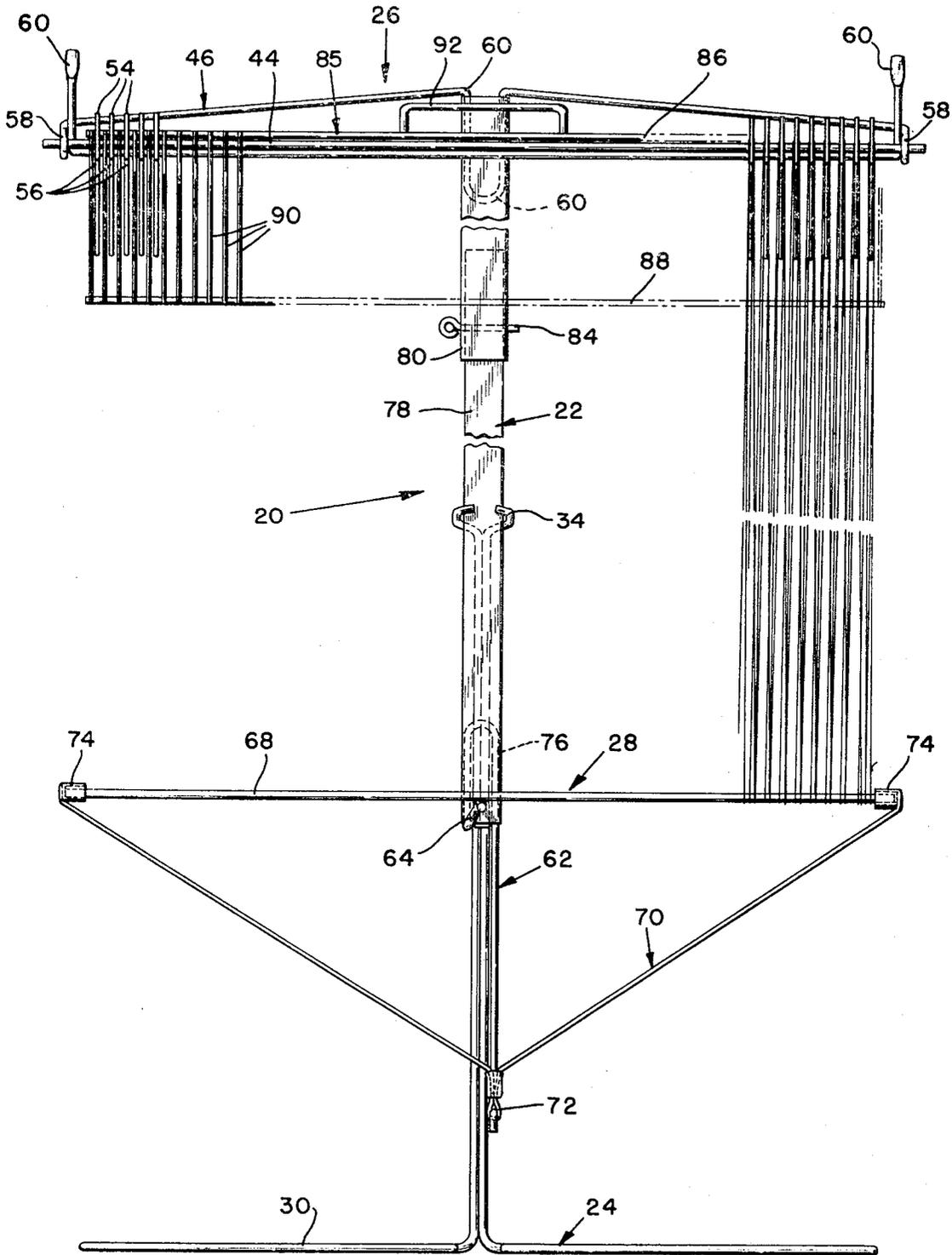


FIG. 1

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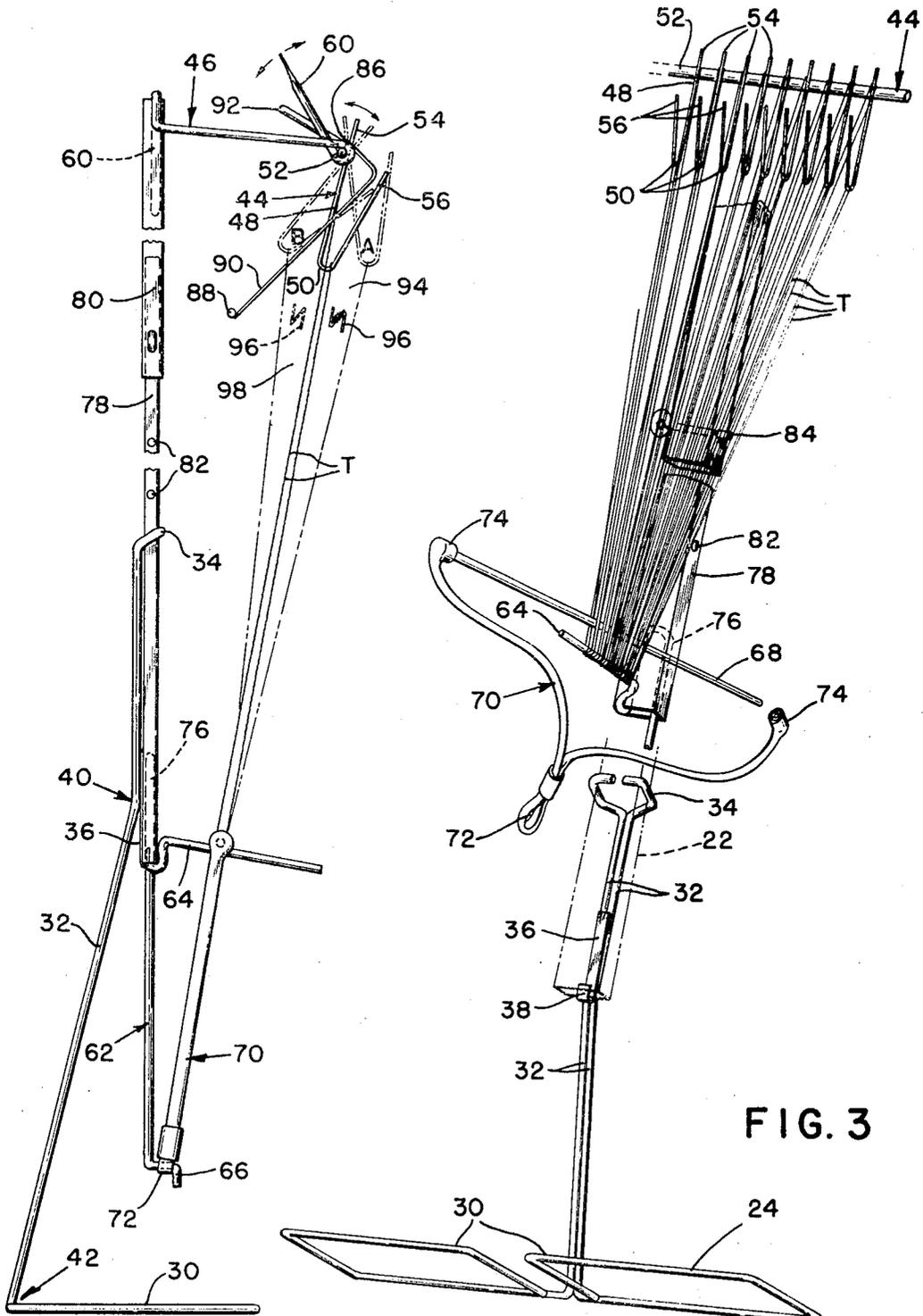


FIG. 2

FIG. 3

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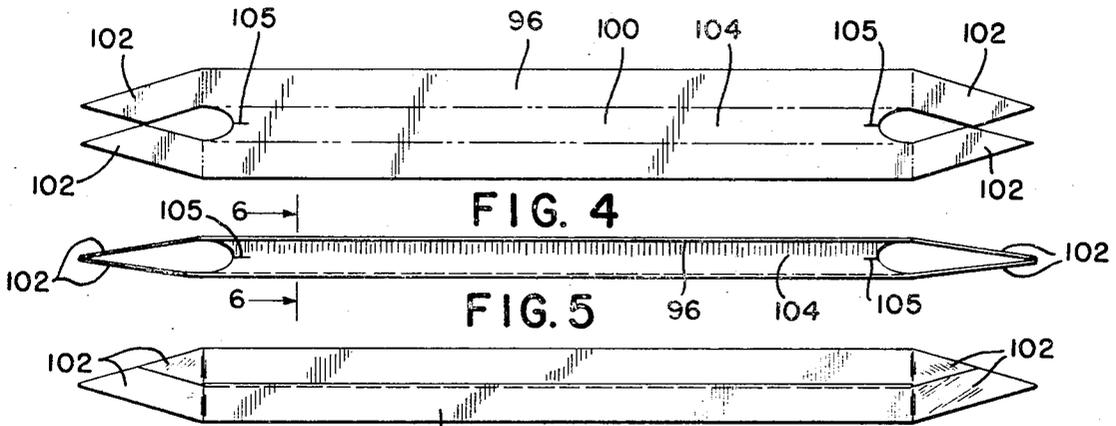


FIG. 4

FIG. 5

FIG. 7

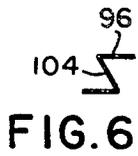


FIG. 6

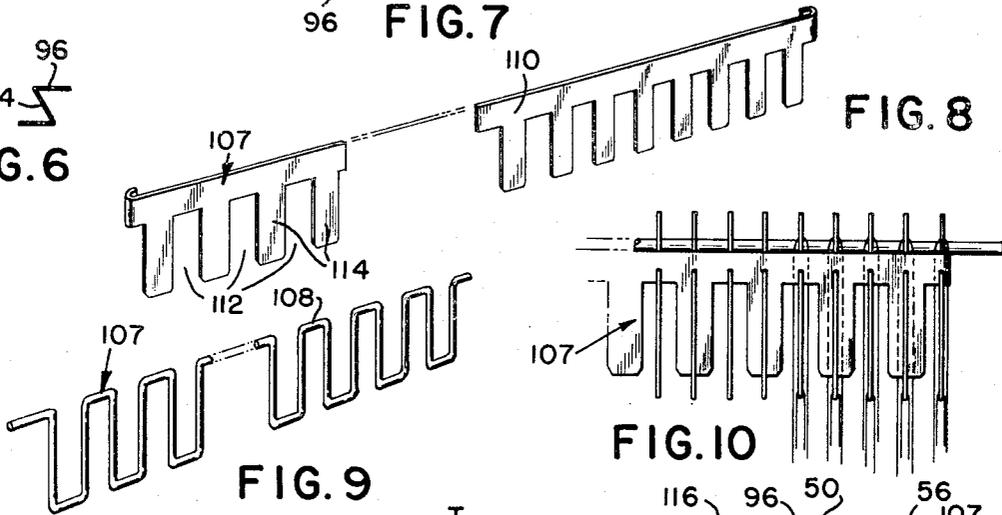


FIG. 8

FIG. 9

FIG. 10

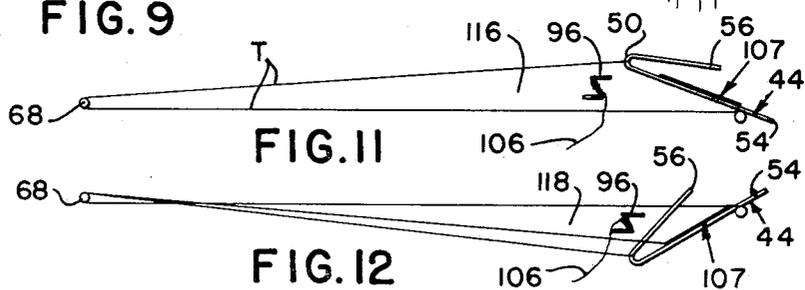


FIG. 11

FIG. 12

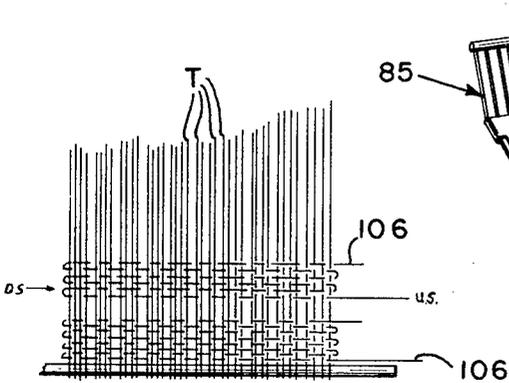


FIG. 13

FIG. 14

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HAND LOOM

BRIEF SUMMARY AND OBJECTS OF THE INVENTION

This invention relates generally to hand looms and more particularly to a new and unique hand loom of simple construction.

Briefly, the hand loom includes an upper warp retaining assembly and a lower warp retaining and stringing assembly mounted upon a support frame a preselected spaced distance apart and having warp threads stretched therebetween. The upper warp retaining assembly enables the number of threads per inch to be doubled since two threads can be carried by each of a series of wire hooks. The lower warp retaining and stringing assembly includes a post for facilitating threading of the loom in a continuous flowing action and a tension applicator for automatically adjusting the tension applied to the warp threads during the weaving operation. The lower warp ends are held by a retaining bar rather than a series of fixed hooks, as disclosed in applicant's U. S. Pat. No. 3,347,381.

The upper support member is pivotably mounted so it may be alternately moved in opposite directions to form alternate sheds for passing therethrough a shuttle carrying weft yarn.

Templates may be provided upon the reed or upper warp retaining assembly for changing the warp thread shed combination thus having the advantage of making different patterns or designs in the fabric.

One of the primary objects of the invention is the provision of a new and unique hand loom which eliminates the need for harnesses or heddles.

Another object of the invention is the provision of a hand loom having means for automatically compensating for tension build-up during the weaving operation.

Still another is the provision of a hand loom having means for threading the loom faster and more accurately.

A further object of the invention is the provision of a hand loom for doubling the number of warp threads per inch without increasing the loom size.

One feature of the invention is the provision of a hand loom which permits the transposing of threads to create various designs.

Other objects and advantages of the invention will become apparent when considered in view of the following detailed description.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a front elevational, broken view of a hand loom constructed in accordance with the principles of the present invention and illustrating the alignment of the warp between the lower weaving frame support member and the upper warp retaining assembly;

FIG. 2 is a side elevational, broken view of the hand loom showing the normal position of the upper warp retaining assembly and reed in solid lines and the alternate shed-forming positions of the upper warp retaining assembly;

FIG. 3 is a fragmentary perspective view of the hand loom illustrating the manner of threading the loom;

FIG. 4 is a plan view of a form adapted to be folded into a shuttle and bobbin arrangement designed for use with the present hand loom;

FIG. 5 is a side elevational view of the folded shuttle and bobbin arrangement;

FIG. 6 is a cross-sectional view taken along line 6—6 of FIG. 5;

FIG. 7 is a top plan view of the shuttle and bobbin arrangement of FIG. 5;

FIG. 8 is a fragmentary, perspective view of one embodiment of a template adapted to be releasably fastened to the upper warp retaining member or the beater for changing the warp thread combination;

FIG. 9 is a fragmentary, perspective view of another embodiment of a template adapted to be releasably coupled to the upper warp retaining member or a beater;

FIG. 10 is a fragmentary plan view of the template of FIG. 8 mounted upon the upper warp retaining assembly;

FIGS. 11 and 12 are fragmentary, side elevational views of the hand loom having a template secured to the upper warp retaining assembly and illustrating a shuttle being passed through the sheds;

FIG. 13 is a fragmentary, plan view of a fabric woven utilizing various templates of the type illustrated by FIGS. 8 and 9; and

FIG. 14 is a fragmentary, perspective view of the template of FIG. 8 releasably attached to the beater or reed.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawing and particularly to FIG. 1, the hand loom 20 comprises an elongated, telescopic support rail or frame 22 adapted to be releasably supported upon a base stand 24. Mounted at the upper end of the frame 22 is an upper warp retaining assembly 26 and at the lower end thereof, a lower warp retaining and stringing assembly 28.

The base stand 24 preferably is of wire construction having a generally rectangular base support portion 30 and generally vertically disposed parallel members 32 which are bent at the upper ends thereof for forming a loop 34. The support frame 22 is of tubular construction and the lower portion substantially conforms in cross section to the configuration of loop 34 such that the frame 22 is inserted through the loop 34 and supported by the generally J-shaped hook 36, as shown by FIGS. 2 and 3. The hook 36 may be welded or otherwise suitably secured to the frame 22 so that the end 38 of the hook is received within the lowermost open end of the frame. The parallel members 32 are bent at 40 and angularly disposed at the juncture 42 with the base support portion 30 to balance and support the hand loom in a vertical position.

The upper warp retaining assembly 26 includes an upper warp retaining member 44, having hooks thereon and a warp retaining support member 46. The retaining member 44, rather than having alternating long and short hooks, as disclosed in applicant's U. S. Pat. No. 3,347,281, is composed of a series of wires 48 having a V-bend 50 therein. The series of wires 48 are commonly mounted upon a pivotable cross member 52 with the ends 54 and 56 extending behind and in front of the pivotable cross member 52. Thus the number of warp threads T per inch can be doubled since the threads are looped twice over each wire hook 48, once over end 54 and once over end 56. Each wire hook forms a long projection between the V-bend 50 and the end 56 to keep the threads from overriding, and at the back end of the hooks 48, the end 54 projects over the

pivotable retaining bar 52 thus creating a second hook for each wire.

The pivotable cross member 52 has end portions inserted into and carried by loops 58 formed by the warp retaining support member 46. Preferably the support member 46 is constructed of a continuous piece of bend resistant wire having a central tongue portion 60, which is adapted to be inserted within the open upper end of frame 22, and the loops 58 at each end thereof. Upwardly disposed handles 60 are provided at each end of and rigidly secured to the pivotable cross member 52 and the warp retaining member 54 for angularly displacing the series of wire hooks 48 relative to the support member 46 and support frame 22.

The lower warp retaining and stringing assembly 28 comprises a wire member 62 having a post 64 extending substantially normal to the frame 22 and a hook portion 66 which extends below the lower end of frame 22. The post 64 enables the threading of the hand loom to be a continuous flowing action focusing the lower end of the warp threads to the one point thereby facilitating the threading operation. The hook portion 66 holds the retaining bar 68 for the lower ends of the warp threads through a tension applicator 70. The tension applicator is made of resilient material and has a looped, central portion 72, adapted to be placed over hook portion 66, and end portions 74 forming sockets for releasably receiving the ends of retaining bar 68. The flexible tension applicator 70 automatically adjusts the amount of tension applied to the warp threads after each row of the woof has been woven. By uncapping one end 74 of the tension applicator 70 from the retaining bar 68, the bar 68 can be removed, automatically sealing off the lower end of the material woven resulting in a three-selvage fabric or a fabric which is ravel resistant on three sides. The wire member 62 is slidably retained within the lower open end of frame 22 by a tongue portion 76.

In order to vary the length of the threads forming the warp and to vary the spacing between the lower warp retaining and stringing assembly 28 and the upper warp retaining assembly 26, the frame 22 is formed of two telescopic members 78 and 80. The member 78 has a series of openings 82 therein, FIG. 2, for receiving a locking pin 84. The sleeve member 80, having a pair of aligned openings therein for receiving the pin 84, is slidably adjusted upon the member 78 until openings in the sleeve 80 are aligned with a selected pair of openings 82 and 78. Thereafter, the pin 84 is inserted for locking the member 78, 80 in a fixed relation.

A reed or beater 85 is formed from two substantially horizontally positioned rods 86, 88, the rods being joined together in a fixed, spaced apart relationship by a series of bent and swept back wire members 90 which are secured at each end to rods 86, 88 by welding or other suitable means. A handle 92 is shaped and attached to the upper rod 86 to give an operator a convenient gripping portion for the desired manipulation of the reed 84. The reed is normally positioned, when not in use, adjacent the upper warp retaining assembly 26, as shown by FIG. 2.

Before operation of the hand loom, the tension applicator 70 and retaining bar 68 are removed to facilitate threading of the warp yarns. The weaver simply ties a loop in the end of the warp thread, drops it over post 64, goes to the wire hook member at one end, loops the thread around one hook end 56 or 54, back down and

around the post 64 and returning around the other hook end 56 or 54 until the desired number of warp threads have been threaded. A loop then is tied in the yarn, dropped over post 64, and the remaining yarn severed.

The lower retaining bar 68 is inserted in front of post 64 and the end portions capped by socket 74, as shown by FIG. 3. The tension applicator loop 72 is then placed over hook 66. The threads are lifted off the post 64 by bar 68 and the beater 85 is moved down the warp threads T towards the bar 68 and the threads are automatically spread along retaining bar 68 at the proper distance for weaving. There is no threading of a beater as in conventional looms since the reed 85 acts as the beater and is pre-threaded when the warp is applied to the retaining member 44.

By pivoting handles 60, 60 counterclockwise, FIG. 2, the upper warp retaining member 44 and hooks 48 are rotated to the position A to form a shed 94 through which a shuttle 96 may be passed. The shed forming yarn separation is achieved by rotating the V-bend portions 50 of wires 48 to displace the threads supported thereby to the A position. The threads retained over hook ends 54 are not displaced substantially during the pivoting action of upper warp retaining member 44.

When it is desired to form an opposite shed 98, the upper warp retaining member 44 is displaced clockwise by handles 60 to the B position. This opposite positioning moves the threads retained by hook ends 54 and threads retained by the U-bend portions 50 from their generally coplanar relation, as shown in full lines FIG. 2, to form the shed 98 for receiving shuttle 96.

Referring to FIGS. 4-7, the shuttle 96 is formed from a flat blank 100 preferably of plastic material and of the configuration illustrated by FIG. 4. The blank 100 is bent or deformed to define a generally Z-shaped cross-sectional configuration, FIG. 6. The pointed or tapered end portions 102, when folded, converge towards each other to form a tapered end section for each shuttle end which facilitates insertion of the shuttle through a shed. The central portion 104 is adapted to have a supply of yarn 106 wrapped thereabout with the inner end of the yarn retained within slits 105 provided at each end of the central portion. The shuttle may be of a length generally corresponding to the width of the upper and lower warp retaining assemblies. The weaver turns the shuttle to unwind yarn therefrom as the weft yarn is needed during weaving.

FIGS. 8-10 relate to a device for changing the warp thread shed combination thus giving the loom the advantage of multi-harness weaving. The device is a comb-like template 107 made of wire 108, FIG. 9, or sheet material such as plastic 110, FIG. 8, which snaps into place on the upper warp retaining member 44. Alternatively, the template may be releasably secured to the reed or beater 85, as shown by FIG. 14.

The spaces 112 between the teeth 114 permit certain threads T to work freely of the teeth 114 of the template 107 and deflect certain of the threads causing them to act other than in the way in which the loom is strung. As shown by FIG. 11, in forming the shed 116, the template 107 has no effect on the threads. In FIG. 12, the shed 118 is formed by pivoting the upper warp retaining member 44. It is to be noted that movement of the retaining member 44 and template 107 deflects prescribed ones of the threads T passing around the

ends 54 of wire hooks 48 thus creating a different shed combination.

The particular configuration of the template 107 may vary depending upon the desired pattern or design. This would give unlimited combinations of arrangements of warp threads such as 1 up, 2 down; 3 up, 1 down; 2 up, 3 down, etc. The template 107 also could be formed of two plates placed back to back so that a simple sliding in one plate relative to the other would result in different shed combinations.

I claim:

1. A hand loom for weaving material comprising; a support frame, an upper warp retaining assembly supported by said frame and having a warp thread supporting member thereon, a lower warp retaining and stringing assembly secured to said support frame in spaced relation to said upper warp retaining assembly, a reed member movable with respect to said upper warp retaining assembly, and means for pivoting said upper warp retaining assembly to form preselected sheds upon actuation thereof whereby the formed preselected sheds of warp permit a shuttle to be passed therethrough for forming a woven material, said lower warp retaining and stringing assembly including means for applying tension to the warp threads and for permitting automatic adjustment of the warp threads during a weaving operation, said means for applying tension including a resilient member having at least one portion fixedly supported with respect to said support frame and at least one portion displaceable relative to said support frame.

2. A hand loom as recited in claim 1, said support frame including a base stand for supporting said hand loom in an upright position.

3. A hand loom as recited in claim 1, said support frame including telescoping members and means for adjustably positioning said telescoping members relative to each other to vary the spacing between said upper warp retaining assembly and said lower warp retaining and stringing assembly.

4. A hand loom as recited in claim 1, said warp thread supporting member of said upper warp retaining assembly comprising a series of spaced wires fixedly secured to a pivotable cross member, each end of each of said wires having warp threads looped thereover.

5. A hand loom as recited in claim 4, each of said wires having a V-bend therein adjacent one end portion and a second end portion extending beyond said pivotable cross member such that said end portions extend in front of and behind said cross member.

6. A hand loom as recited in claim 1, said lower warp retaining and stringing assembly including a post for facilitating stringing of said warp and a support for said tension applying means.

7. A hand loom as recited in claim 6, said lower warp

retaining and stringing assembly further including a retaining bar having warp threads looped therearound.

8. A hand loom as recited in claim 7, said means for applying tension to the warp comprising a flexible, resilient assembly having sockets thereon for receiving the ends of said retaining bar, said resilient assembly permitting movement of said retaining bar relative to said upper warp retaining assembly during weaving of material.

9. A hand loom as recited in claim 8, said sockets permitting removal of said retaining bar from the warp to allow removal of the warp from the upper warp retaining assembly.

10. A hand loom as recited in claim 1, and further including templates adapted to be releasably secured to said upper warp retaining assembly for changing the warp thread shed combination.

11. A hand loom as recited in claim 1, and further including a shuttle for passing through said sheds to form a woven material, said shuttle being of unitary construction having a central yarn supporting portion having a generally Z-shaped cross-section and tapered end sections.

12. A hand loom as recited in claim 11, each of said tapered end sections comprising end portions converging to facilitate passing of said shuttle through the sheds, and means provided at each end of said central portion for attaching yarn to said shuttle.

13. A hand loom for weaving material comprising; a support frame, an upper warp retaining assembly supported by said frame and having a warp thread supporting member thereon, a lower warp retaining and stringing assembly mounted upon said support frame in spaced relation to said upper warp retaining assembly, a reed member movable with respect to said upper warp retaining assembly, and means for pivoting said upper warp retaining assembly to form preselected sheds upon actuation thereof whereby the formed sheds of warp permit a shuttle to be passed therethrough for forming a woven material, said warp thread supporting member comprising a series of spaced wires fixedly secured to a pivotable cross member, each of said wires having a V-bend therein adjacent one end portion and a second end portion extending beyond said pivotable cross member such that said end portions extend in front of and behind said cross member.

14. A hand loom as recited in claim 13 wherein warp threads are looped over each end portion of each of said wires to form a warp.

15. A hand loom as recited in claim 13 and further including templates adapted to be releasably secured to said warp thread supporting member for changing the warp thread shed combination.

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