May 6, 1941. W. J. HINES ET AL 2,241,199

HAND LOOM

Filed Aug. 12, 1938

Fig. 1.

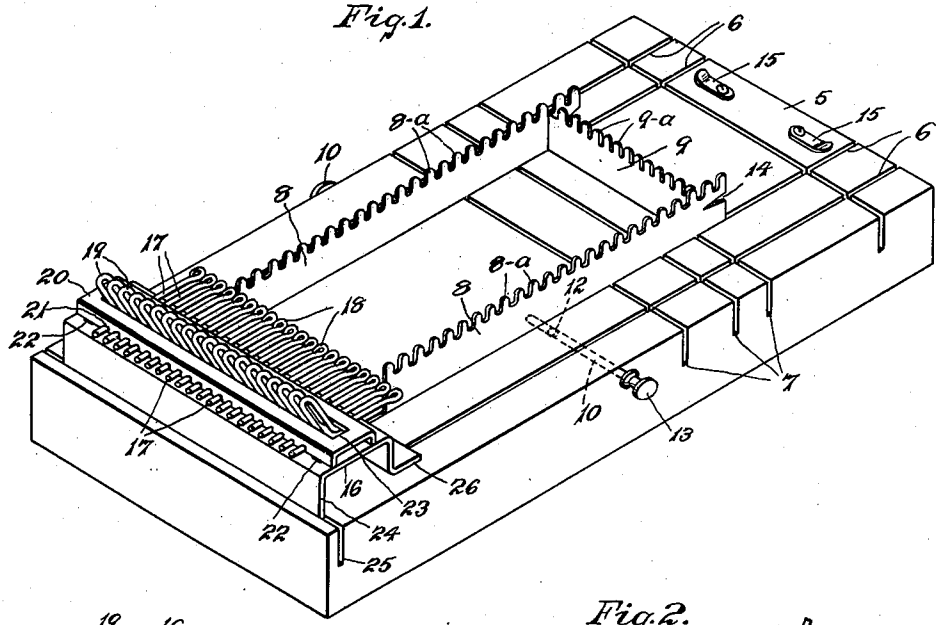


Fig. 2.

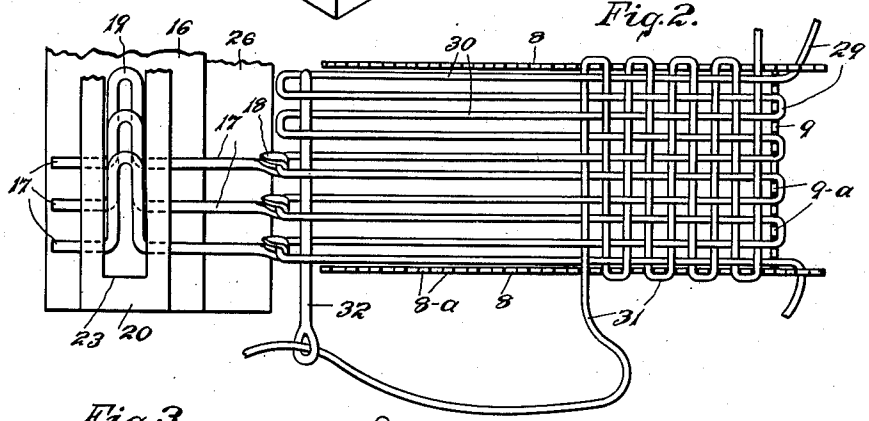


Fig. 3.

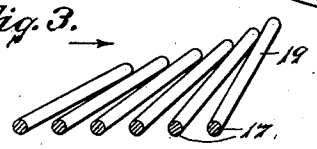


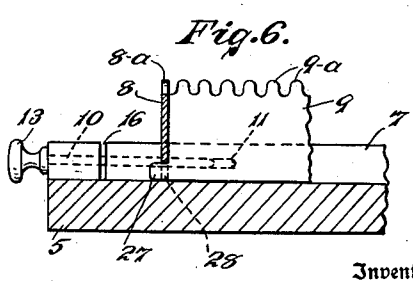
Fig. 4.
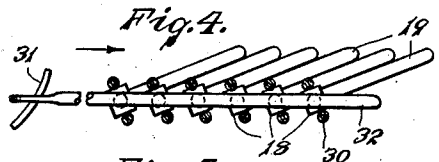


Fig. 5.



Fig. 6.



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UNITED STATES PATENT OFFICE

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HAND LOOM

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Application August 12, 1938, Serial No. 224,430

8 Claims. (Cl. 139—33)

This invention relates to hand looms and is intended, particularly, for use in weaving sheets of textile fabrics.

The principal object of the invention is to provide an apparatus which can be adjusted so that various sizes of such sheets may be woven thereon.

A further object of the invention is the provision of inexpensive means for reversing the position of warp threads to permit fast operation in threading the filling threads therethrough with a needle.

Other objects and advantages of our invention will be readily understood from the following description and from the accompanying drawing, in which:

Figure 1 is a perspective view of our improved loom.

Figure 2 is a fragmentary plan view, in elevation, illustrating the operation of weaving a fabric thereon.

Figure 3 is a diagrammatic end view illustrating the operation of the warp reversing mechanism of our improved loom.

Figure 4 is a similar view illustrating the said mechanism in position to dispose warp threads in one position.

Figure 5 is a similar view illustrating the same in position to dispose the warp threads in the opposite position.

Figure 6 is a detail fragmentary view in vertical section of a portion of our improved loom, illustrating the manner of assembling the fabric supporting bars to the base thereof.

As illustrated in the drawing, our improved loom comprises a base 5 having a series of longitudinal grooves 6 and transverse grooves 7 therein which are adapted to receive longitudinal toothed bars 8, for supporting the filling threads, and a transverse toothed bar 9 for supporting the warp thread. Each of the longitudinal bars may be anchored in either of the longitudinal grooves 6 by means of anchoring pins 10, of which there is one provided at each side of the base 5. Each of these pins fits in a hole 11 which extends across the groove 7 disposed at one side of the base and the said pin extends through an opening 12 in each of the bars. The said pins are provided with a knob 13 to permit withdrawal thereof when it is desired to remove the bars 8 and 9 from the base.

The longitudinal bars 8 are provided at their ends with notches 14 to provide means for anchoring the ends of the warp thread. If desired, cleats 15 may be provided on the base 5 for anchoring the said warp thread when they are found more convenient to use.

At one end of the base 5, and opposite to the warp thread supporting bar 9, I provide a series of warp thread hooks which are pivotally mounted upon a hook supporting base 16. Each of the said hooks are constructed of a piece of wire forming a stem 17 which is formed at one end to provide a hook 18 and bent, intermediate its ends, to form a tappet 19.

The said hooks are disposed with their stems parallel to the top of the base 5, on an axis with the teeth on the bars 8 and 9 and are rotatably secured to the top of the supporting base 16 by means of an inverted U-shaped spacing bar 20 which has a series of notches 21 at opposite sides thereof to receive the stem 17 of the hooks. The said spacing bar is secured upon the surface of the base 16, by means of prongs (not shown) which extend through notches 22 in the said base, and has a longitudinal slot 23 through which the tappets 19 extend.

The hook supporting base 16 is secured to the base 5 by means of an upright portion 24 which fits in a groove 25 that is provided in said base and has a flange 26 at its opposite side resting on the surface of the base 5.

When desired, the said hook supporting base may be detached from the base 5 with the entire hook assembly thereon.

From the illustration in Figure 6 of the drawing, it will be noted that the warp supporting toothed bar 9 is anchored in the base 5 by means of a tab 27, at each end thereof, which extends through a notch 28 in each of the side bars 8.

In the operation of our improved loom, the warp thread 29 is first threaded through the teeth 9a of the bar 9 and through the hooks 18, as clearly illustrated in Figure 2 of the drawing, to form a series of loops 30 having parallel threads. The ends of the said warp thread may be then anchored by hooking them into the notches 14 as clearly illustrated or, if desired, they may be anchored under the cleats 15.

All of the hooks 18 are then turned in one direction by running a finger across the top of the bar 20, in the direction indicated by the arrow in Figure 3, and thus positioning all of the tappets 19 against each other as clearly illustrated in Figures 4 and 5.

This places all of the hooks at an angle so that the threads at one side of the warp loops are disposed over and those at the opposite side are disposed under.

A filling thread 31 is then woven through the

warp threads, by means of a needle 32, which may be inserted between the "over" and "under" warp threads and moved across the entire number of warp threads in the loom. When the filler thread has thus been inserted, it is moved back and looped around the teeth 8a of the longitudinal bars or side bars 8 as clearly illustrated in Figure 2. This serves to support the fabric on all sides and at the same time enables the production of fabric sheets which are exactly uniform in width and number of warps and filler threads.

After each time that the needle 32 is threaded between the "over" and "under" warp threads, the hooks are turned to their opposite position by running the finger across the tappets 19 and the needle 32 is always moved or inserted between the warp loops in the direction to which the tappets point; thus eliminating error in inserting the filler thread so as to properly register with the preceding filler strand.

It will be noted that the tappets 19, being formed by simply bending the hooked wires to form a U-shaped bend, eliminate costly methods of providing such tappets on the hooks. Further, the said tappets, being of sufficient length to engage the adjacent tappets, will insure that all of the hooks will register in one direction for each operation; it being impossible to have any of said hooks turned in a relatively opposite direction to its adjacent hook for the reason that each tappet cannot be turned independently of the adjacent tappet. Also, each tappet will tend to swing with it the next tappet thereto, as clearly illustrated in Figure 3, when a finger is moved across the tappet in the direction of the arrow shown therein, or in the direction to which the tappets are to be turned. Thus joint operation of the tappets is performed each time that the position of the hooks is to be reversed.

As clearly illustrated, in Figures 4 and 5, of the drawing, when the tappets are in one position, all of the threads forming the warp loops will register one above the other. When the hooks are turned to the opposite direction, the position of the threads is reversed.

It will be noted that the ends of the side bars 8—8 are spaced from the hooks 18. This is to permit insertion of the needle 32 between the warp threads at a point near the hooks where the spacing between the "over" and "under" warp strands is the greatest and thus the needle is permitted to pass through with the greatest amount of ease. After all the spaces between the teeth on the side bars 8 have been filled, one or more extra filler threads may be inserted to fill the warp threads for the distance between the bars 8 and the hooks. The sheet of fabric is then completed and it may be removed from the loom by simply releasing the warp ends from the notches 14, lifting the sheet off the teeth of the bars 8 and 9 and unhooking the same from the hooks 18.

By providing the side bars 18, each sheet of fabric produced on our improved loom will be of a uniform width for its entire length for the reason that each filler thread will be exactly the same length as the others and thus a very important advantage is gained over looms heretofore produced where no side bars have been provided. It has, heretofore, been impossible to produce sheets of uniform width for the reason that, when the said bars are not provided, the length of the filler threads may vary according to the amount of pull given to the thread 31. It has also been difficult to produce sheets having exactly the same number of filler threads and which were exactly of the same shape so that, when sewn together to form a larger sheet, such as a blanket or the like, the said loops formed by the filler threads and the warp threads would register with the corresponding loops of the adjacent sheets.

With our improved loom, fabric sheets of different sizes may be produced thereon by simply inserting toothed strips of suitable lengths in the proper grooves 6 and 7 for the size of sheet which is desired.

It will be noted that there are enough of the hooks 18 extended across the base to cover the distance between the two furtherest longitudinal grooves 6. When the loom is adjusted for a small sheet, the extra hooks may simply overlap beyond the edges without in any way encumbering the weaving operation.

The hooks 18 and the teeth on the bars 8 and 9 may be spaced in accordance with the number of threads per inch which are desired in the fabric to be produced. It will, therefore, be understood that, while we have illustrated and described one form of a loom embodying our invention, the same may be varied in its construction to a greater or lesser extent without departing from the scope of our invention as set forth in the following claims.

We claim:

1. A loom of the character described comprising a base having a series of longitudinal and transverse grooves in the top surface thereof, and a plurality of toothed strips extending vertically above said base and selectively mounted in said grooves to receive loops of warp threads and filler threads of sheets of fabric of various sizes.

2. A loom comprising a base having a plurality of longitudinal and transverse grooves, in the top surface thereof, two toothed bars mounted in two of said longitudinal grooves, a separate toothed bar mounted in one of said transverse grooves, and a plurality of rotatable hooks in a row extending in front of the ends of the said two bars and opposite and parallel to the said separate bar.

3. A loom comprising a base having a series of toothed bars forming three sides of a rectangle thereon and adjustable on said base to provide rectangles of different sizes, a row of rotatable members disposed adjacent to said strips and forming another side of said rectangle, and means for securing said strips on said base comprising a pin extending transversely through the base and projecting through an opening in each of said strips.

4. A loom comprising a base having a plurality of grooves therein, strips mountable in said grooves and having a row of teeth in the edge thereof for receiving the threads of a fabric, and means comprising a pin extending through an opening transversely across said grooves and an opening in each of said strips for securing the said strips upon said base.

5. A loom comprising a base having a series of toothed strips vertically mounted thereon, means on the top surface of said base for selectively positioning said strips to provide three sides of a rectangle on said base and a row of pivoted horizontally disposed hooks adjacent to said strips and providing the other side of said rectangle.

6. In a loom of the character described, a base, a sub-base mounted on said base, a plurality of hooks mounted on said sub-base, an inverted U-shaped retaining bar secured to said sub-base and having notches in the edges thereof to rotatably retain said hooks in parallel spaced relation upon said sub-base, a U-shaped bend in each of said hooks forming a tappet extending therefrom through a slot in said retaining bar and in adjacent position, relative to the tappets of the adjoining hooks, whereby the said hooks may be successively rotated by a sliding movement of a finger upon the said retaining bar and in the direction of the longitudinal axis thereof.

7. A loom of the character described comprising a base, oppositely disposed parallel toothed strips on said base, a separate similarly toothed strip disposed perpendicular to and between said parallel strips with the ends thereof into abutment with said strips, and projections on said separate strip extending through openings in said parallel strips for adjustably interlocking the said separate strip to the said parallel strips and retaining the same in relative position.

8. For a loom of the character described, the combination consisting of a base, rows of loop retaining means forming three sides of a rectangle on said base, and a row of pivotally mounted loop retaining means on a line transverse to two of said rows, to form the fourth side of said rectangle, and spaced from the ends of said two rows to permit the insertion of a weft needle between said row and ends.

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