CHAPTER 6

PREPARING THE LOOM

THIS PART OF THE WEAVING PROCEDURE is often called *dressing the loom.* It includes:

Winding the warp onto the warp beam
Threading the heddles
Threading the reed
Attaching the warp to the cloth beam
Making the tie-up: connecting the treadles to the lams and these to the harnesses
Making the various adjustments preliminary to the actual weaving

► WINDING WARP ONTO WARP BEAM

Place two sticks or bars just inside the loom uprights, one on either side of the loom from front to back. They should rest on the breast beam and back beam and will support the spreader and lease sticks. Next, place the spreader across the loom in front of the uprights and tie to the supporting sticks and the uprights at the sides of the loom. (Figure 6.2 shows this arrangement.)

If a wide warp is being used, remove the harnesses from the loom. Tie the harnesses together securely to prevent the heddles from shifting their position and to make them easy to handle. If the warp is narrow the harnesses need not be removed from the loom. Simply push the heddles to either side of the center until sufficient space is cleared to allow the warp to pass through.

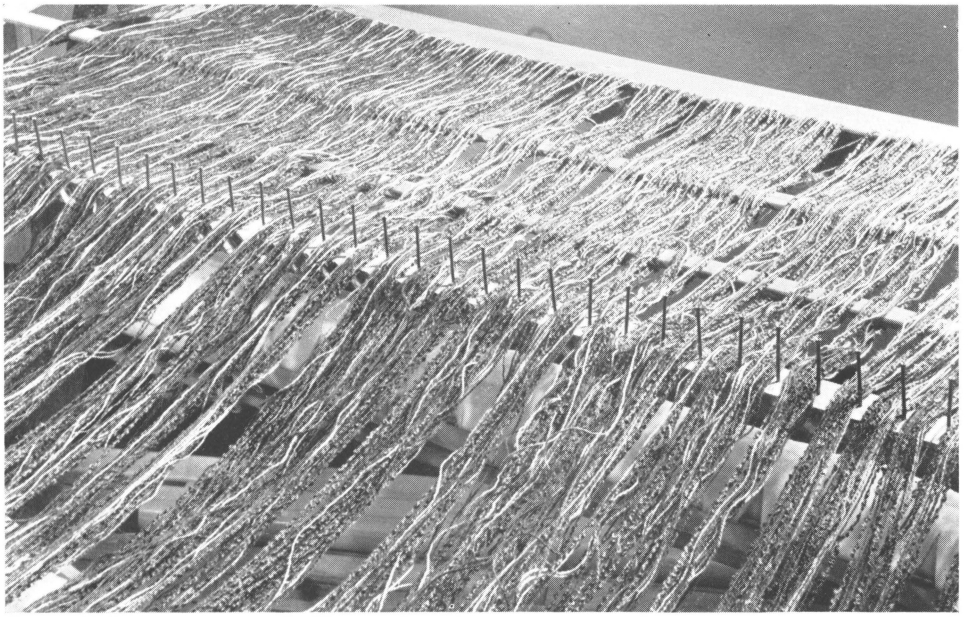
Lay the warp chain across the loom, the end containing the three

crosses at the back beam, with the end that had been at the starting peg falling across the breast beam.

Now insert the lease sticks in the warp through the openings made by the two pegs on the warping reel to keep the cross in position. Place a temporary warp stick (or the permanent one if the loom is equipped with ropes instead of canvas) through the loop made by the last peg on the warping reel. Figure 6.1 shows these sticks keeping the warp crosses in place. Insert a cord through the ends of the lease sticks. After tying the ends to the top of the loom there should be sufficient length of cord to allow the lease sticks to slide independently and freely to the back of the loom as the warp is wound. As the lease sticks are not fastened tightly together they can be moved forward individually, a decided advantage in handling a warp that is inclined to be sticky.

With the warp stick fastened to the back beam the cords which were used to tie the crosses can be removed. The warp is now arranged from the front to the back of the loom with the bulk of the warp chain at the

Fig. 6.1—Warp spread across the loom and spaced by inches in the spreader. Lease sticks, just back of the spreader, maintain the cross while the temporary warp stick holds the end of the warp. Next, warp will be put on the permanent warp stick in the canvas attached to the warp beam. Harnesses have been removed.



front. Beginning at the center, arrange the warp in the spreader by inches; or, by placing the last inch counted at the proper distance from the center, work toward the center and on to the opposite side. Do not break up the 1-inch units or warp groupings.

Suppose a warp of 36 inches is being put on the loom. Slip the last inch that was counted during the winding into the 18th space from the center, the next inch section in the 17th space from the center, the next inch section in the 16th space, and continue. By the time the last inch, or section, is in place the cord used to tie, or lace, them will have been removed and the warp will lie in a straight line from the back of the loom toward the front, as shown in Figure 6.1. Handle the warp gently to avoid stretching or shifting the yarns out of place. Tie a rod or heavy cord to the spreader back of the dividers to hold the warp sections in place during winding. Now that the warp is spread across the loom it can be slipped onto the permanent warp stick if not already there.

At this point a yarn of contrasting color is looped through the lease sticks to mark the center.

The person who is to hold the warp at the front of the loom during the winding should grasp it tightly and ease out snarls or irregularities by slapping it against the breast beam. Running the fingers across the warp will help to separate sticky yarns without stretching them. The warp should not be combed or pulled lengthwise, as this stretches the more elastic yarns beyond the tension maintained when winding the warp. To minimize any variation in tension it is important that one person hold the warp while winding. Furthermore, it should be held together in a bundle below and in front of the breast beam, over which it rides as winding proceeds. This position is illustrated in Figure 6.2. This will insure a tight tension for the outside sections of the warp.

In winding a warp of mixed yarns some of the less elastic yarns will have a tendency to "drip" and hang below the regular warp. However, this unevenness in tension will adjust itself once the warp is on the loom.

As the warp is wound onto the warp beam allow the lease sticks to move toward the back. If irregularities of tension have caused the warp to tangle in front of the lease sticks remove such tangles by separating with an up-and-down or crosswise movement of the fingers until first one then the other lease stick can be moved forward close to the spreader. Then proceed with the winding. Keep a close watch immediately in

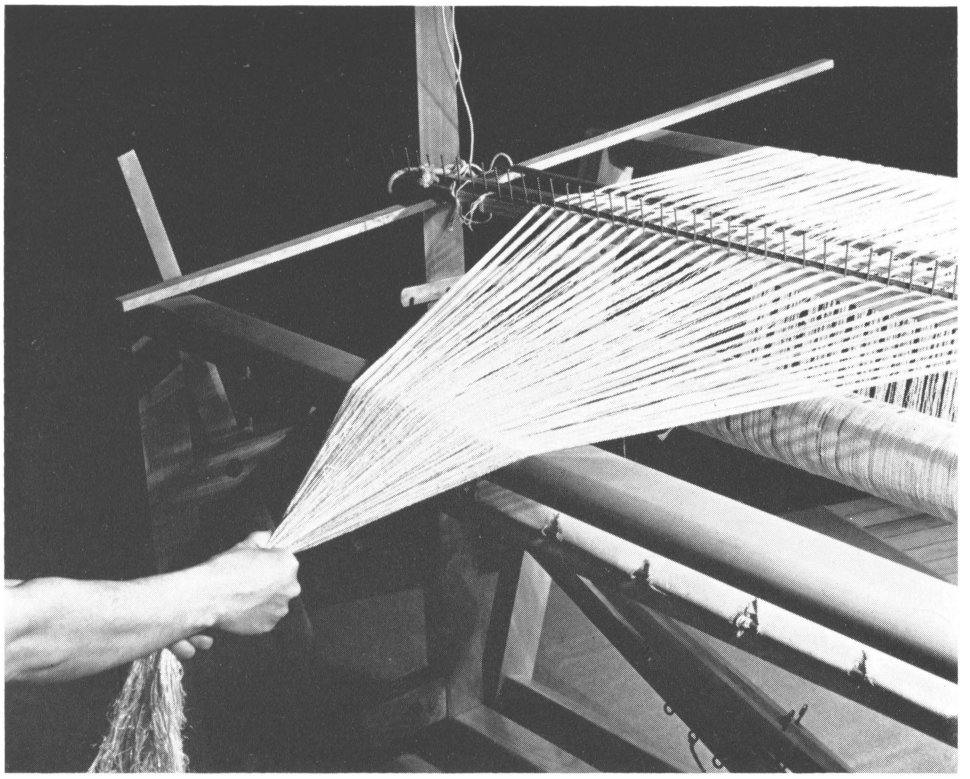


Fig. 6.2—Warp gathered together and held down firmly over the breast beam. Cord and rod at the spreader hold warp yarns in place. Spreader and lease sticks are supported by slats which reach from front to back and are tied to the loom uprights. Harnesses have been removed.

front of the spreader for loose or stretched yarns which might twist around the separating nails.

To keep the warp from piling up and becoming irregular in length as it is wound onto the warp beam, use plenty of sticks, winding these in with the warp. This is especially true of textured yarns and of long warps. The sticks should be as long as the warp beam. Heavy paper can be used with the shorter warps, but even here it is best to use some sticks with the paper. Note these sticks in Figure 6.3.

When most of the warp has been wound onto the beam, leaving the final 15 to 18 inches for threading, cut the ends at the position of the beginning peg, trim any uneven ends, divide in half, and tie in easy slip knots. Then remove the spreader and allow the warp ends to hang in front of the lease sticks.

► THREADING THE HEDDLES

Remove the breast beam if the loom permits, in order to work close to the harnesses. Hang the harnesses in place at a convenient level for threading, usually slightly higher than the position for weaving, for threading is easier if the heddle eye is level with the line of vision. The lease sticks should be supported and lifted also.

Before beginning to thread, it is important that there are enough heddles and that they are properly distributed on the four harnesses for the threading desired. For twill threading the number of heddles on each harness should be ¼ the total number of warp ends.

When the warp unit includes a variety of yarns, a sample to show the order of threading should be taped to the front of the loom for easy reference while threading.

Fig. 6.3—Warp sticks wound in with the warp to prevent piling up and to maintain an even tension. Note one stick being placed while others are spaced around the beam and wound in with the warp.

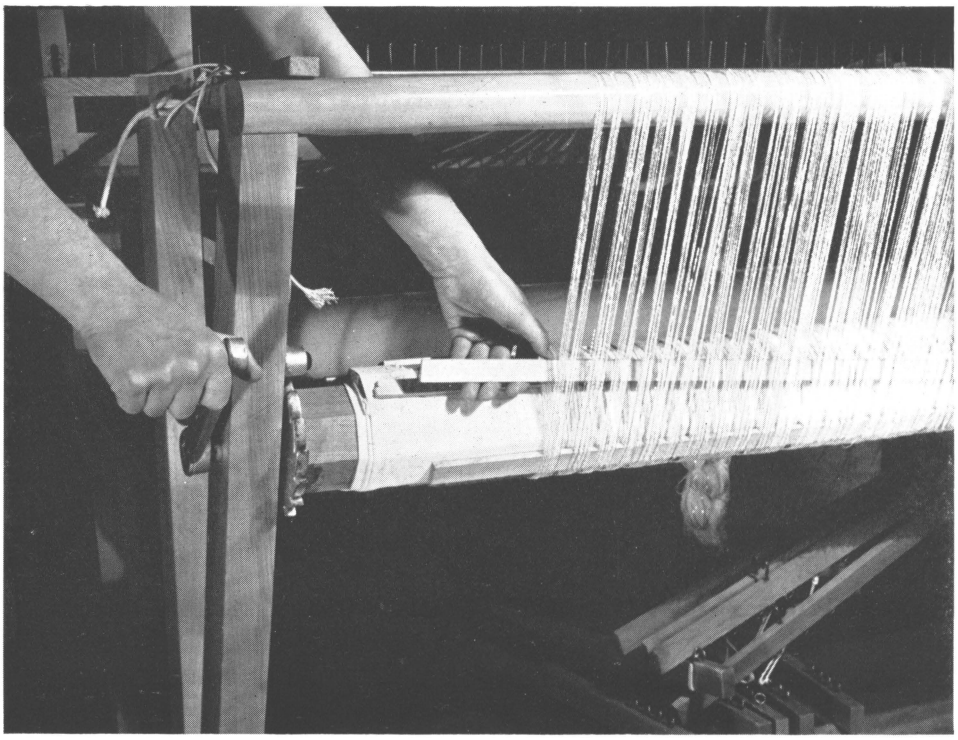


Fig. 6.4—Threading the warp. Yarns are held between the fingers for a simple twill threading. The four yarns are brought forward from the front lease stick without crossing each other. Yarns at right have been threaded through heddles. Warp yet to be threaded can be seen hanging over lease sticks at left. If harnesses were removed to wind the warp onto the warp beam, they have now been hung in place as before.

Fig. 6.5—Threading the heddles. Starting at the back harness, the yarn that was held between the thumb and first finger has been threaded through the heddle on Harness 4; yarn held between first and middle finger, through heddle on Harness 3; third yarn in the left hand is being threaded through heddle on Harness 2; and the fourth warp end farthest to the left will be threaded through heddle on Harness 1.

Where the design is dependent upon the character and combination of yarns used, the twill threading is the most satisfactory, and that one will be explained here. Other threading patterns will be explained in Chapter 9.

To begin threading, clear the center of the harnesses by pushing the heddles to the right and left from the center. Pull one heddle from each harness on the right side of the center. Arrange the heddles to form a diagonal from left at front to right toward the back. Choose four warp yarns in proper sequence as shown in Figure 6.4.

The warp yarn for Heddle 1 lies between the little finger and ring finger of the left hand, the yarn for Heddle 2 between the ring finger and middle finger, and so on. Figure 6.4 shows the position of these yarns in the hand.

Begin by threading, from back to front, the heddle on the back harness with the yarn lying between the first finger and thumb, pulling

the yarn forward to the right of all four heddles. Proceed, letting each yarn fall to the right of the next heddle. The last heddle (on the front harness) will be threaded with the yarn lying between the little finger and the ring finger (Fig. 6.5). Continue in this order until the right half of the warp is threaded.

Return to the center and thread the left half of the loom in the same manner, using exactly the same position of the hand and being careful not to change the sequence of yarns in the unit. There must be no twisting of warp yarns between the lease sticks and the heddles.

When using two warp yarns, alternating a novelty and a smooth yarn, the position of the yarns will be as follows: starting with the smooth, all smooth yarns will be on Harnesses 1 and 3; all novelty on 2 and 4.

When using three warp yarns—for example, red, white, and blue—the first set of four heddles will be red on Heddle 1, white on 2, blue on 3, red on 4; the second set of four heddles will be white on 1, blue on 2, red on 3, white on 4, with yarns on 1 and 4 always the same.

With four warp yarns, the sequence of yarns will be the same for each set of heddles.

The threading for sequence of yarns of any number of units can be worked out in a similar manner. However, if the paddle has been used in winding the warp the individual yarns will appear in their proper sequence.

In general, leave sufficient length of warp for threading so that warp ends can fall clear in front of the harnesses. Tie the warp ends in easy slip knots in any desired unit size. Check frequently for mistakes.

► THREADING THE REED

This process is also called *sleying.*

Place a supporting slat on either side, resting on the front and back of the loom frame.

Lay the reed flat on these slats.

Untie the knots of warp and pull the yarns through the reed with a reed hook or other device such as the back of a case knife. Adjust the heddles so the yarns will be in a straight line from front to back as they are pulled through the reed. Figure 6.6 shows the reed flat and in process of being threaded.

Begin threading at the right side of the reed, measuring from the

center to find the starting point. If the warp is wide, measurement must be exact to avoid leftover warp ends.

The warp ends must be pulled through the reed in the same sequence in which they were threaded through the heddles or the shed will not open clearly.

If a selvage has been planned, the extra ends will be threaded as planned. Check the reed frequently to avoid any mistakes such as extra yarns through a dent or empty dents. Again tie the yarns in front of the reed in any convenient grouping in soft slip knots.

Arrange the reed in the beater. Measure to be sure the warp is in the center of the loom. Replace the breast beam.

► ATTACHING WARP TO THE CLOTH BEAM

There are several ways of tying the warp in preparation for weaving, and each weaver usually has his favorite. One that has proved satisfactory is described here.

Begin at the center. Pick up a group of yarns, covering approximately a 1-inch space in the reed.

Holding the yarns as a group, work out any unevenness of tension, by gently pulling or sliding the warp ends through the fingers, working from the back toward the front.

Bring the group of yarns forward over the top of the cloth stick to which the yarns are to be tied, divide into two equal parts, cross them

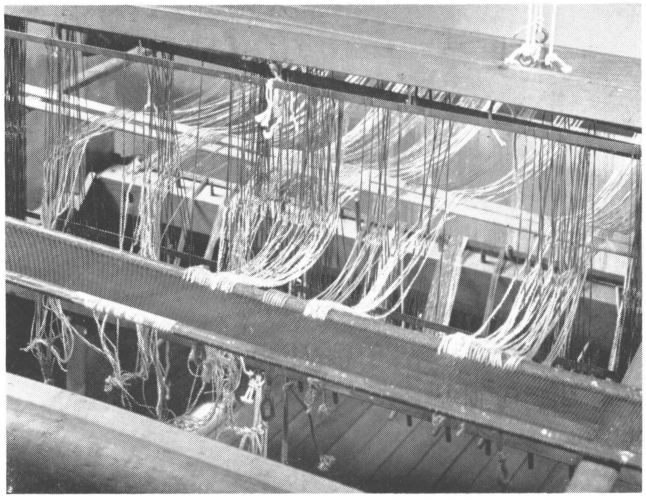


Fig. 6.6—Reed is threaded according to a planned spacing. Note the reed is in position across the front, resting on the front-to-back bars. After threading is completed, reed will be placed in position in the beater. Warp is for a bamboo screen.

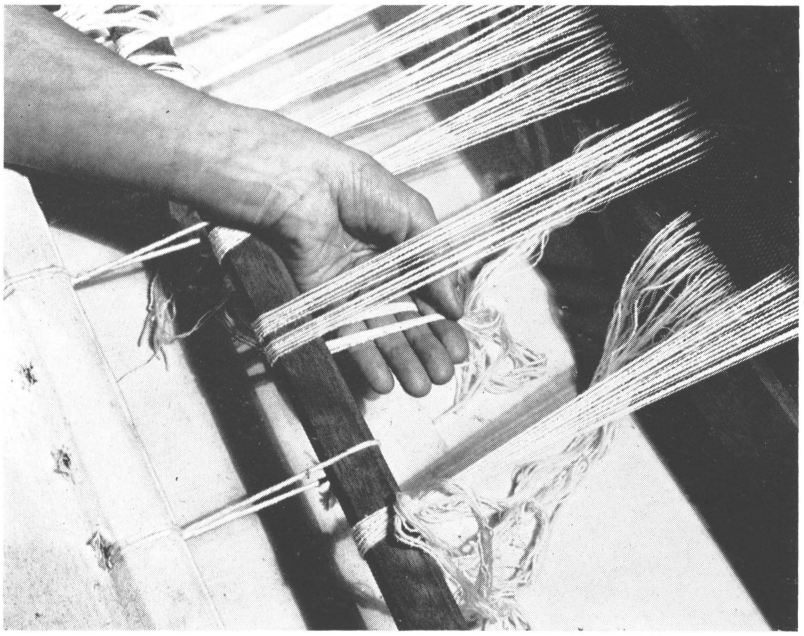


Fig. 6.7—Tying warp to cloth apron. In the first step, a unit of yarns coming through the reed is brought over the warp stick and divided into two sections. Warp stick has been tied to cloth apron at regularly spaced intervals.

Fig. 6.8—Second step is to tie the temporary knot. Divided sections are brought around outside and over whole group and tied in a simple knot.

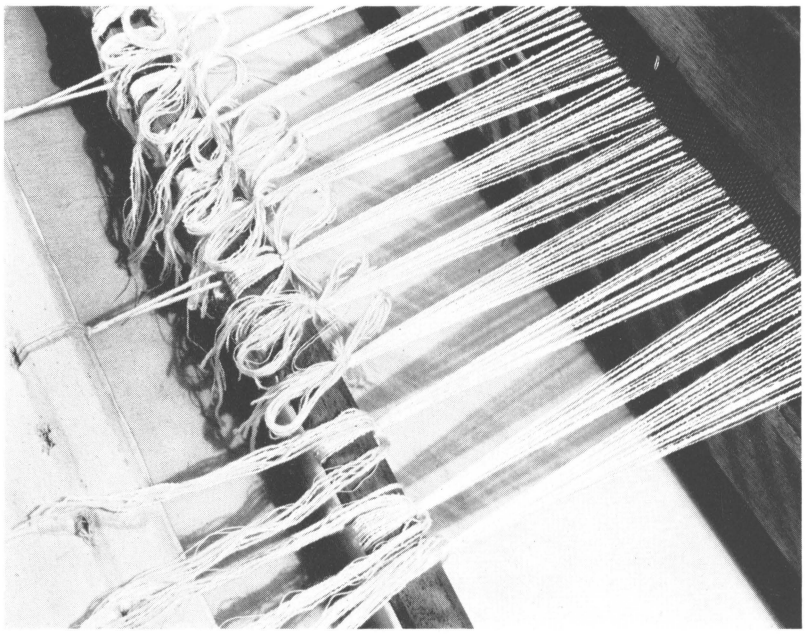


Fig. 6.9—Third step shows single knot pulled up firmly and tied in a bowknot. Illustration shows both temporary and finished knots. In the final adjustment, tying is done from the center toward either side to insure tight selvages.

underneath, bring a section up on either side of the original group and tie them in a simple knot.

Begin the preliminary tying of these knots on either side of the center, then tie the outsides, then near the center, alternating until all the warp ends have been tied. Adjust the tension and re-tie with a bow knot. In this second, or permanent tying, begin at the center and tie back and forth on either side of the center, *tying the outside knots last.* This is necessary to make sure the warp yarns are tight at the selvage. Follow these steps in Figures 6.7, 6.8, and 6.9.

► TIE-UP OF HARNESSES, LAMS, AND TREADLES

The interest in most contemporary fabrics is produced by the combination of yarns rather than the threading or more intricate tie-ups. Most contemporary weaving is based upon the twill threading and one of three tie-ups, which will be explained here. The tie-ups used are:

Tabby or *plain weave,* in which 2 treadles only are used, tied respectively to Lams 1 and 3, and 2 and 4 (Fig. 6.10).

Plain twill, in which 4 treadles are used, tied to Lams 1 and 2, 2 and 3, 3 and 4, 4 and 1, respectively, and treadled 1, 2, 3, and 4 (Fig. 6.11).

A *combination of tabby and twill,* for example, selecting any pair of twill treadles to be alternated with the plain, or tabby, treadles. In Figure 6.12, the *standard* tie-up, this might be Treadles 6, 1, 5, 3, with treadles numbered from left to right. Disconnect those treadles not to be used.

► ADJUSTING THE LOOM

Check the harnesses, lams, and treadles for the proper position. Begin at the top by tying the harnesses together and adjusting their height until the warp yarns form a straight line from the back beam to the breast beam. All harnesses must be at *exactly* the same height. The lams should hang parallel to the floor or slightly higher, all equally distant from the harnesses or from the floor. Adjust the treadles last, keeping them at a height comfortable for the worker and at a position that will open a good shed when the treadles are depressed.

Untie the harnesses and check for a clean shed—the triangular open-

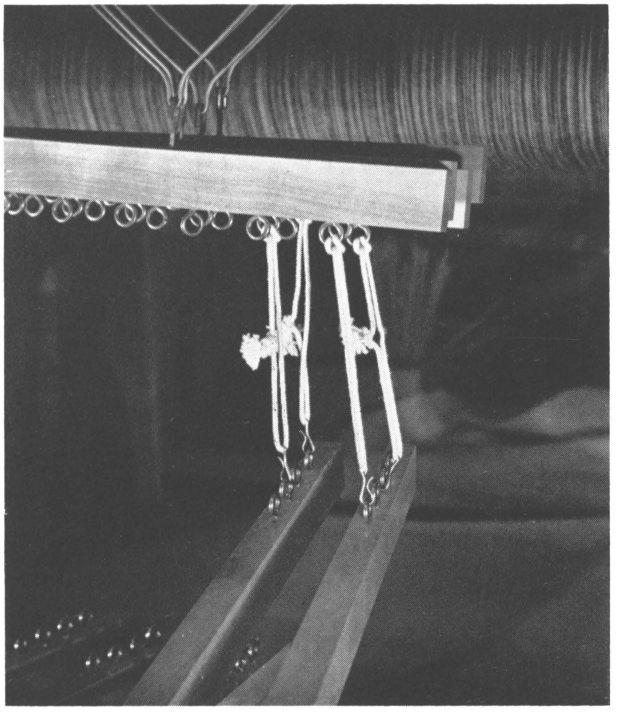


Fig. 6.10—Treadle tie-up for plain or tabby weave. Treadles at lower front are attached by cords to the lams (wooden bars running crosswise), and these in turn are hooked to metal rods fastened to the harnesses. Right treadle is hooked to Lams 1 and 3; left treadle to Lams 2 and 4.

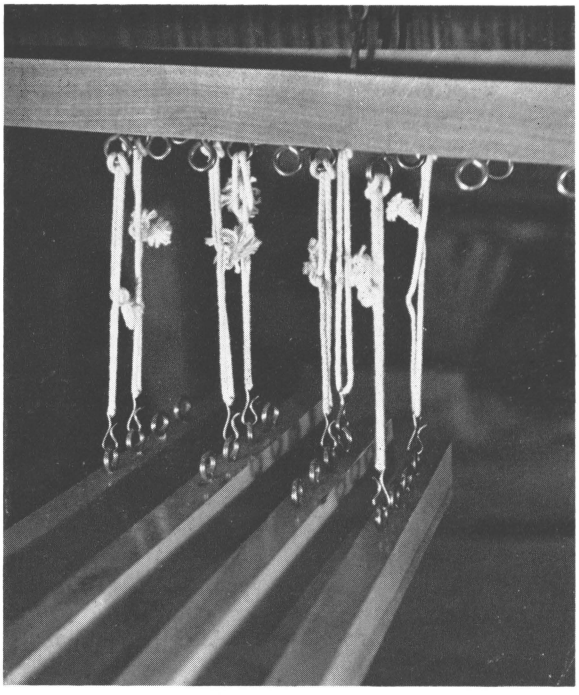
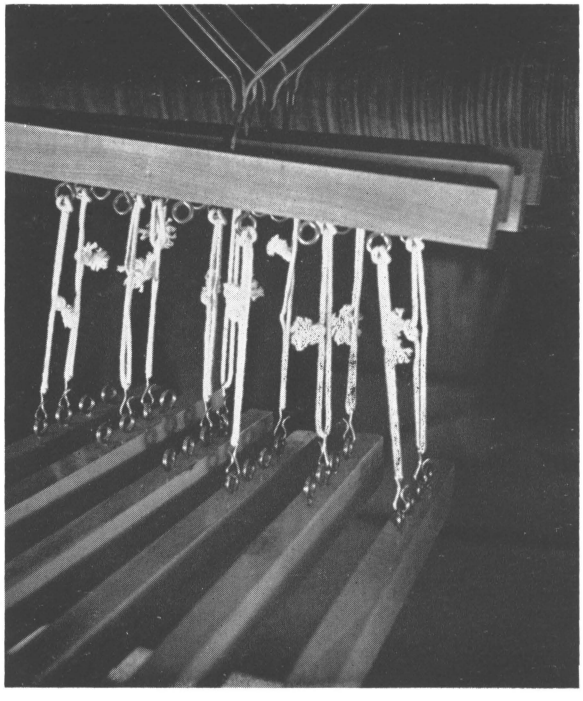


Fig. 6.11—Tie-up for simple twill. Note the 1 and 2, 2 and 3, 3 and 4, 1 and 4 combinations. A twill results when treadled either from right to left, or left to right.

Fig. 6.12—Standard tie-up uses all six treadles. Here the tabby treadles are at the right, tied to Lams 1 and 3, 2 and 4, the four twill treadles at the left. Other arrangements are possible to suit comfort of weaver.



ing in front of the reed, formed by separating the odd and the even warp yarns. A perfect shed results when the yarns on the pair of harnesses being raised are at identical levels. Sagging yarns interfere with the smooth movement of the shuttle. The pair of harnesses that are lowered must present the same picture. Figure 7.1 illustrates a clean, or clear, shed.

If the shed is not clear the trouble may be caused by any one of several reasons, all easily corrected. Some of the most common ones are:

Uneven height of harnesses
Uneven tie-up of lams or treadles
Yarns out of order in the reed
Yarns crossed in the harnesses
Uneven tension of yarns

After the shed has been corrected, a few rows of heavy material are woven in, which will close the spaces formed by the knots where the warp is tied to the cloth beam.

At this stage mistakes in threading the heddles or the reed become quite obvious. Mistakes in threading the reed are not difficult to correct, but a heddle out of order presents a more troublesome problem. Therefore, it is very important to maintain a careful watch as the heddles are threaded to make certain every warp end is threaded, and in the proper sequence. A rechecking at two to four inch intervals will save much time, for an uncorrected error may necessitate rethreading the entire loom.

The loom is now ready for weaving.

► CHECK LIST FOR WARPING THE LOOM

1. Remove the harnesses if the warp is wide.
2. Place a stick from front to back on either side of the loom.
3. Place the spreader across sticks and tie securely to the uprights.
4. Hold the warp end containing the three crosses at the back beam and lay the warp chain across the breast beam.
5. Put the warp stick through the loop at the end of the chain.
6. Put the lease sticks through the second and third loops of the cross and tie the sticks securely to the loom.
7. Tie a colored yarn in the lease sticks to divide the warp in half.
8. Cut the yarns holding the crosses; spread the warp across the back beam.
9. Start from the center or at either side and put the warp in the spreader by inches.
10. Tie a cord or extra lease stick across the top of the spreader.

11. Wind the warp onto the warp beam; check the tension frequently.
12. Use sufficient sticks to prevent piling-up of the warp.
13. Remove the spreader; remove the breast beam.
14. Cut the ends of the warp, trim to even length.
15. If harnesses have been removed, replace them.
16. Start from the center and thread the heddles on one side of the loom.
17. Repeat on the opposite side.
18. Replace the breast beam. Lay sticks from the front to the back *again*.
19. Place the reed across the sticks; sley and tie the warp ends in groups.
20. Remove the sticks; place the reed in the beater.
21. Tie the warp to the cloth beam.
22. Start from center and, working from either side of center, *re-tie* in a single bow. Tie the outsides last.
23. Adjust the loom.
24. Test for mistakes.
25. Weave in a heading of heavy yarn to start the web.