

# CHAPTER 5

## MAKING THE WARP

THE WARP INCLUDES ALL THE YARNS which run lengthwise in a fabric. In its preparation the usual procedure is to:

- Estimate the amount of yarn needed
- Assemble the yarns
- Wind the warp
- Remove the warp from the reel

### ► ESTIMATING AMOUNT OF YARN NEEDED

The amount of yarn needed for a warp depends on three factors:

- Number of warp ends per inch
- Width of the warp
- Length of the warp

When planning a project, it is usual for the weaver to weave first a small sample of the fabric he thinks suitable for his purpose. From this sample he gets the first factor, the number of warp ends per inch.

Let us say the sample was set up 16 ends per inch, and that the fabric was to be woven on a warp 36 inches wide:  $16 \times 36 = 576$ , the total number of warp ends in the material.

If the fabric is to have 576 warp ends, and the warp is to be 10 yards long, the total amount of yarn in the warp would be 5,760 yards.

There is no rule covering the widths of warps. In drapery it is wise to wind the warp as wide as the loom permits. In upholstery, the piece to

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Chapters 5, 6, 7, and 8 deal with the manual procedures involved in weaving a fabric. They explain in an orderly sequence the steps for preparing the loom for weaving, the actual weaving process, and how to finish the woven material.

be covered should be considered, so consult the upholsterer first and he will indicate the most economical width to weave. For men's garments we usually plan to have the material finish 27 to 30 inches wide; for women's wear we weave the width that the pattern calls for, which usually varies from 36 to 42 inches. It is wise for the beginner to select narrow widths whenever possible, as it will be easier to maintain a more even "beat" and width with a narrow warp.

Selvages, if used, call for extra warp ends. In most cases we eliminate the selvege entirely and depend on the slight pull-in at the sides to give sufficient edge. However, there are instances when a selvege may be desirable. In making a narrow selvege, put one extra end in each of the two outside dents. For a heavier one, an extra end may be threaded in any number of dents. A good edge results from threading one extra end in each of the four outside dents. Whatever number is used, the weaver must remember to add them to the total number of warp ends in computing the yarn needs.

If a weaver's design sample has more than one kind of yarn in the warp, it is necessary to compute the yardage requirement for each yarn. We must first find the number of times any given yarn occurs in the warp. This is done by dividing the total number of warp ends by the number of yarns in the design unit. This amount is then multiplied by the length of the warp.

In weaving, the up-and-down interlacing of yarns causes a certain amount of take-up, widthwise and lengthwise. This factor must be considered in planning the warp, and an allowance of 10 to 15 per cent is added to the width and length estimates to compensate for this loss. *In addition*, the weaver must allow an extra yard to permit a warp tie at the front and the usual waste at the warp beam.

It is important to have sufficient yarn for the complete warp. Each yarn has a given yardage per pound. After the weaver has determined the number of yards he needs, he should then weigh the yarns he has before starting the warp. When using color, care must be taken to have all yarn for the complete warp from one dye lot.

#### ► WINDING THE WARP

A complete warp should be wound at one time; if a part of the warp is wound now, then completed later on, variations in tension will in-

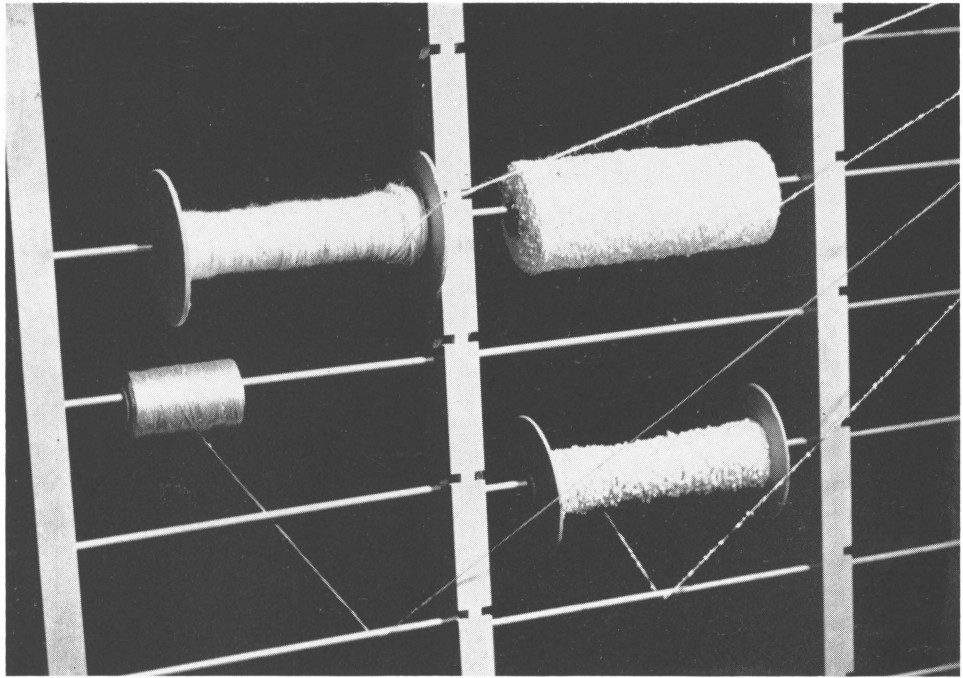


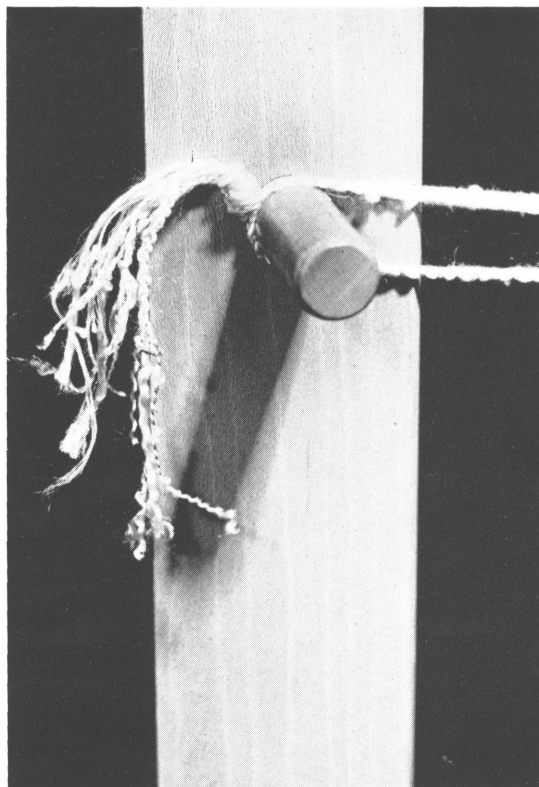
Fig. 5.1—Spools of warp yarns arranged on spool rack ready to wind a warp, the lower two spools showing tension control.

variably result from possible changes in atmospheric conditions or from the human element.

Arrange the spools or tubes of yarn on the spool rack or frame. To secure an equal tension all spools should be approximately the same weight. If some of the yarns are in the form of skeins, these should be wound on spools. Some yarns, particularly the metallics and certain rayons, unwind more rapidly than others and need to be slowed down. An effective way of retarding this rapidly turning spool is to thread the yarn in and out of several bars on the spool rack as shown in the lower spools of Figure 5.1. A fairly accurate test for tension is to pull the group of yarns forward gently to test the “feel” of even tension, then relax the pull and see if they sag, or drape, evenly.

Next, measure a piece of heavy, contrastingly colored cord the length of the planned warp. Attach this cord to the peg at the lower right in Figure 5.4 and wind around the reel in reverse (from right to left) to establish the position of the peg at the top. This peg becomes the *starting*

Fig. 5.2—Ends of the yarns in the warp unit have been tied together and slipped over the starting peg.



peg for winding the warp, and the colored cord becomes the guide for the warp yarns to follow.

To start winding the warp, gather the ends of the yarns together, and tie in a firm knot. Slip this over the starting peg (Fig. 5.2). This is a single peg and is at the opposite end from the three pegs which will form the cross. As the reel is revolved let the yarns slide easily through the hand, with no feeling of tautness in any one yarn. As many as five yarns can be wound together by this method without undue twisting. If the yarns are all linen they should be wound not more than two ends at a time. If more than five yarns are included in the warp unit, a paddle should be used to keep the yarns in their order. A common method for using the paddle for warping is explained in Figures 5.6–5.11.

Note the three pegs on the warping reel at the position of the cross in Figure 5.3. The last peg represents the position of the warp stick while the other two pegs represent the positions of the lease sticks. There will

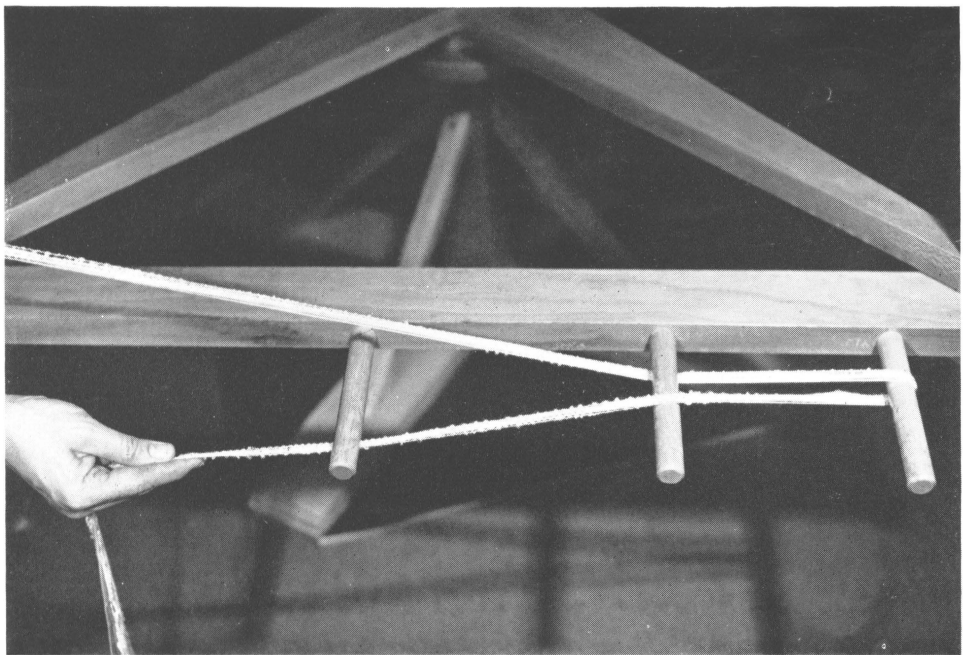


be a cross between these pegs. In this figure the group of five yarns is being wound as a unit. In approaching the series of three pegs, these yarns go over the first, under the second, over and around the third, or end peg. The reverse is true as the yarns return. The reel is revolved, returning the yarn to the starting peg. This process is repeated until the required number of warp yarns has been wound, as shown in Figure 5.4. Some warp reels have the three pegs at the top, but in either case, follow the same method of winding. A reel with two pegs may be used, in which instance the warp stick and one lease stick will be in the same cross, the position of the last peg. If the paddle is to be used, however, the third peg is necessary to make a complete cross.

#### ► TYING WARP TO SECURE THE CROSS

The weaver will have estimated how many yarns he will use in an inch of warp. For example, if his warp calls for 20 yarns per inch, and he has chosen an arrangement of 5 yarns, it will take 4 groups of 5 yarns to complete an inch of warp. Unless the weaver is using a paddle (as explained later in this chapter) this will take 2 complete revolutions

Fig. 5.3—Yarns in the unit are wound together around the three pegs at lower end to form the cross.



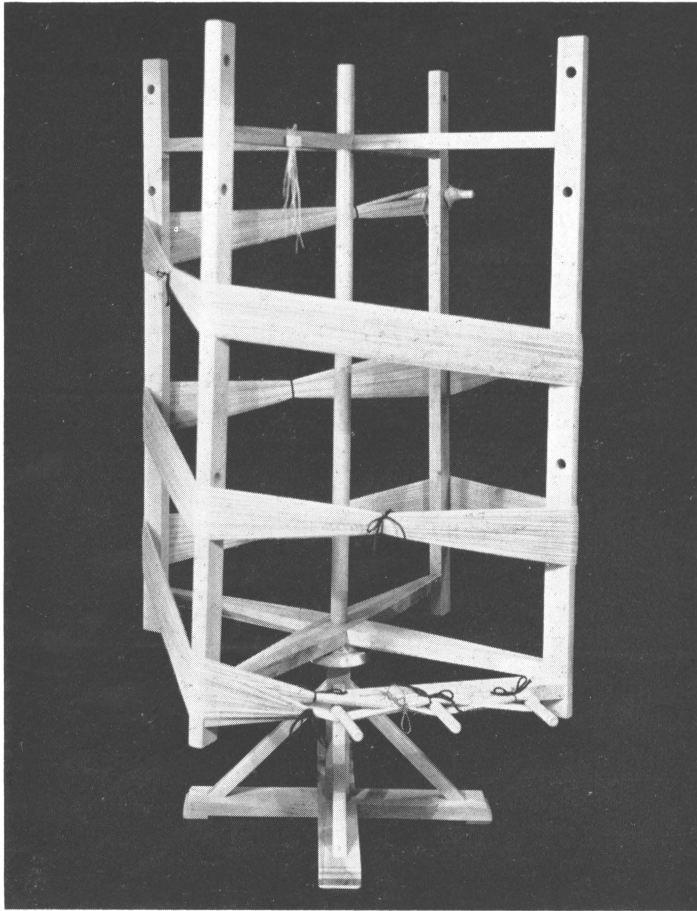


Fig. 5.4—Warping reel with completed warp, showing how it was looped around the starting peg, the cross in place at the bottom, all ties in place, the whole warp ready to be removed.

of the reel—twice forward and twice reversed—to complete the unit of 20 yarns. At this point he will use a yarn of contrasting color to separate the 1-inch groups by looping the yarn around the 1-inch units, near the cross end, between the second and third peg from the end. As can be seen in the chained warp (Figures 5.5 and 5.6) this is laced rather than tied. This division of the warp yarns will make it easy to distribute the yarns in the spreader.

When the warp is completed, it is tied at each lease peg and also at the starting peg to secure the separation in the yarns at these positions. Colored yarns are used for these ties in Figure 5.5, though large blanket pins may be used. A soft rag or blanket pin tying the yarns at the starting peg will simplify cutting the warp ends after the warp is wound on the loom.

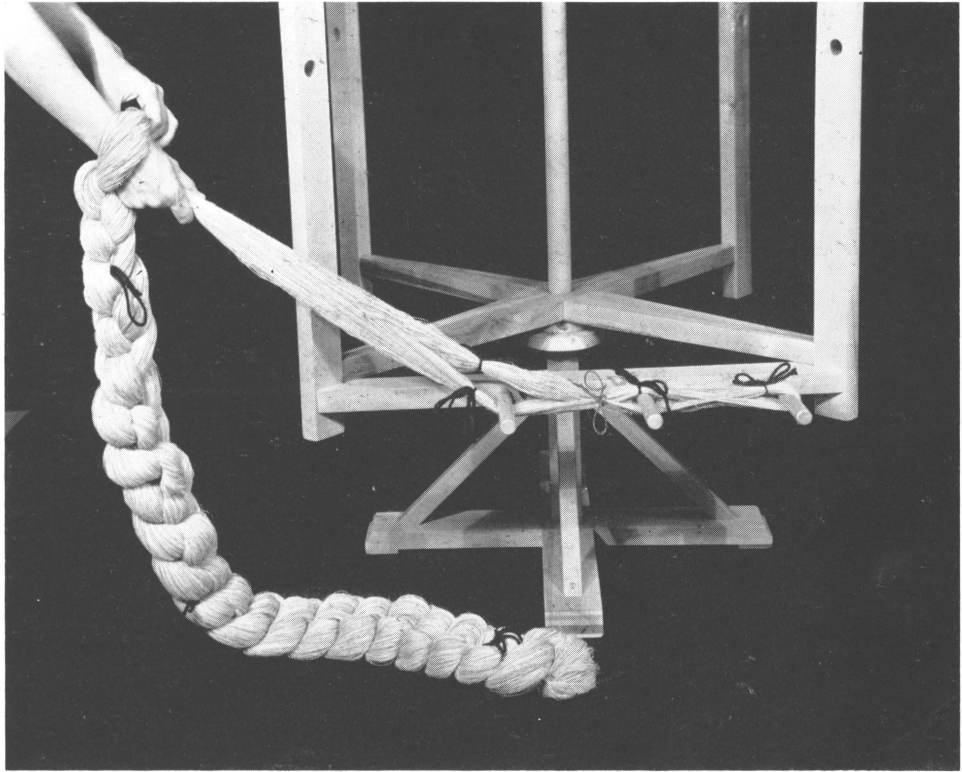


Fig. 5.5—Warp is "chained" from the reel, beginning with the peg at top.

In long warps it is advisable for beginners to tie the warp at intervals of approximately 2 yards. At a position of about  $1\frac{1}{2}$  yards from the cross, this tie should be very tight to prevent the warp from slipping out of place while arranging it in the spreader.

#### ► MAKING THE CHAIN

The warp is removed from the reel by crocheting it into a *chain*. This is done by inserting the hand into the loop of the warp when the starting peg is removed, and pulling the warp back upon itself by a series of loops similar to a crocheted chain, as illustrated in Figure 5.5. The warp should be grasped firmly before removing the peg, and the reel should be turned slowly to prevent the warp from slipping and becoming disarranged. In this form the warp is shortened and is easily handled. If the warp is prepared on a warping board the same procedure is followed. The warp is now ready to be wound onto the loom.



Fig. 5.6—Completed chain. Second and third ties from the end in the foreground secure the cross; interlacing yarn between separates the warp in inches; tie at the right keeps looped yarn in order as it is wound around the last peg.

#### ► USING THE PADDLE

The warp may consist of many combinations of yarns which may be arranged in various ways. The weaver may take 5 to 20 yarns, group them together in an agreeable order, then repeat this unit throughout the width of the warp. In winding the warp, however, he will want to keep them in sequence. To do this under ordinary circumstances it would be necessary to cut and tie each different yarn to its successor and would, of course, involve winding one yarn at a time.

With a paddle he can take as many as 20 different yarns (assuming there are that many in the warp unit) and wind them all at once with the yarns consecutively alternated over the pegs as they would occur if each yarn were wound separately. When more than 5 yarns are in the warp unit, this saves considerable time and prevents sticking and twisting of the individual yarns.

The operation of the paddle is easily understood. The one shown in Figure 2.7 has two rows of holes evenly spaced with the bottom row located slightly in advance of the top row. This bottom row accom-

modates the odd-numbered yarns while the top row is for the even-numbered ones.

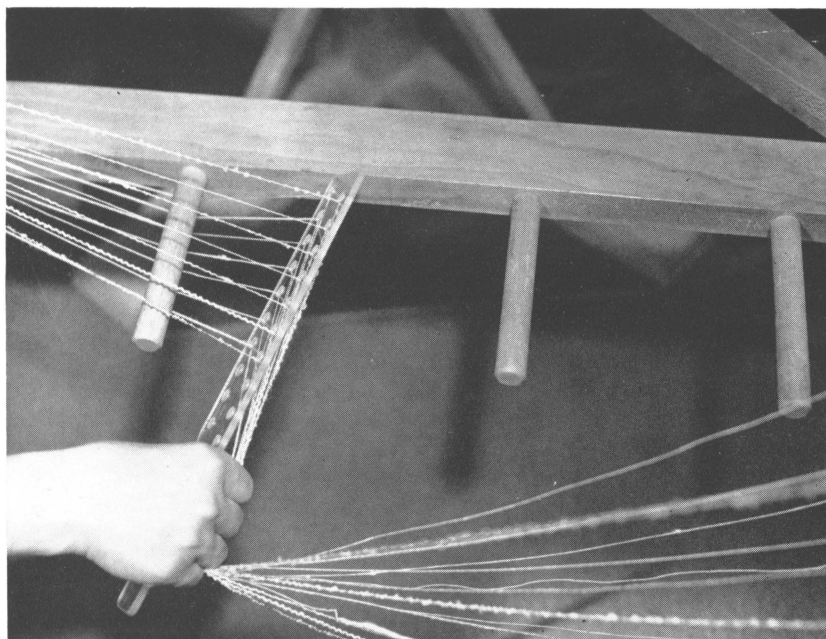
The weaver first charts the exact order of the yarns in the warp unit. Spools for the odd-numbered yarns are placed on one side of the spool rack, ones for the even-numbered yarns on the other. (See Fig. 2.5.)

The paddle is threaded starting with the first hole in the bottom row; this takes yarn Number 1. The second yarn is threaded through the hole in the top row. Number 3 is threaded through the second hole in the bottom and this pattern continued until all the odd-numbered yarns are in the bottom row and all the even-numbered ones in the top.

To wind the warp, tie all ends together and place the knot over the starting peg. The paddle is held between the thumb and forefinger and the yarn is allowed to run freely between the ring and little finger as shown in Figure 5.7. Hole Number 1 must be down.

Approaching the first peg, the paddle is tipped vertically so that as it is advanced forward the even-numbered yarns may be slipped over the peg, the odd-numbered ones below the peg, as in Figure 5.7.

Fig. 5.7—First step in using the paddle at the cross. With odd-numbered yarns on the bottom, even-numbered yarns may be slipped over the top of the first peg.



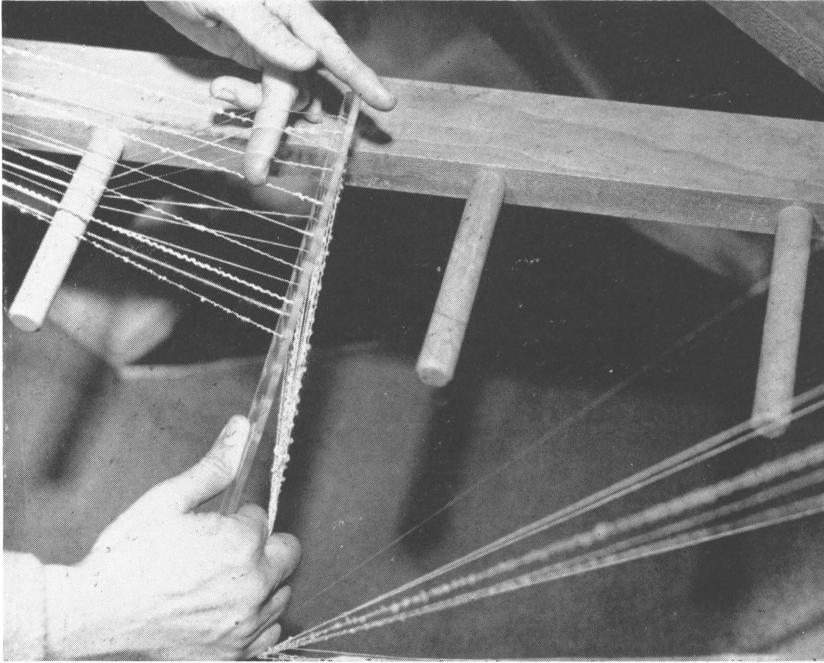
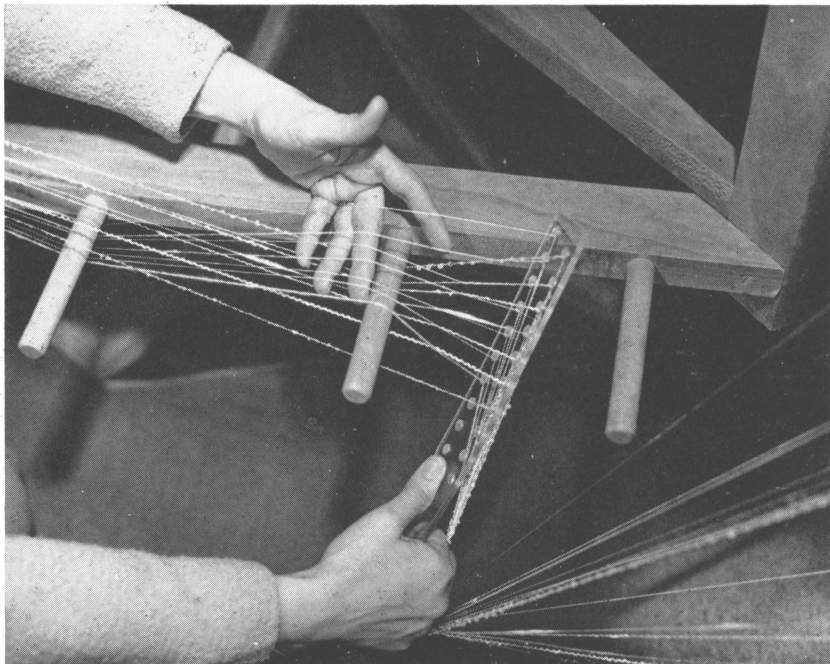


Fig. 5.8—Approaching the second peg. Odd-numbered yarns are picked up and held above the even-numbered, and slipped in this order over the second peg.

Fig. 5.9—Position at the second peg.





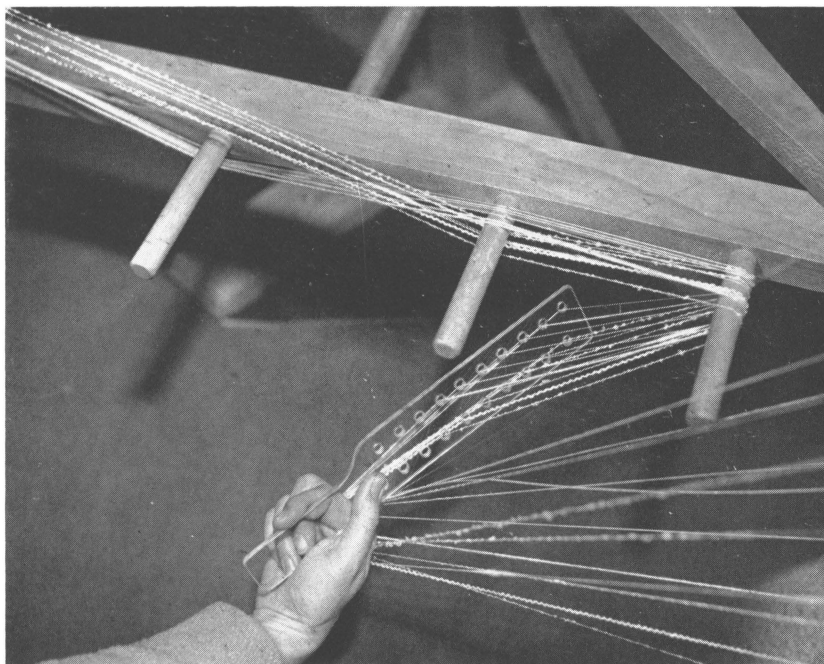
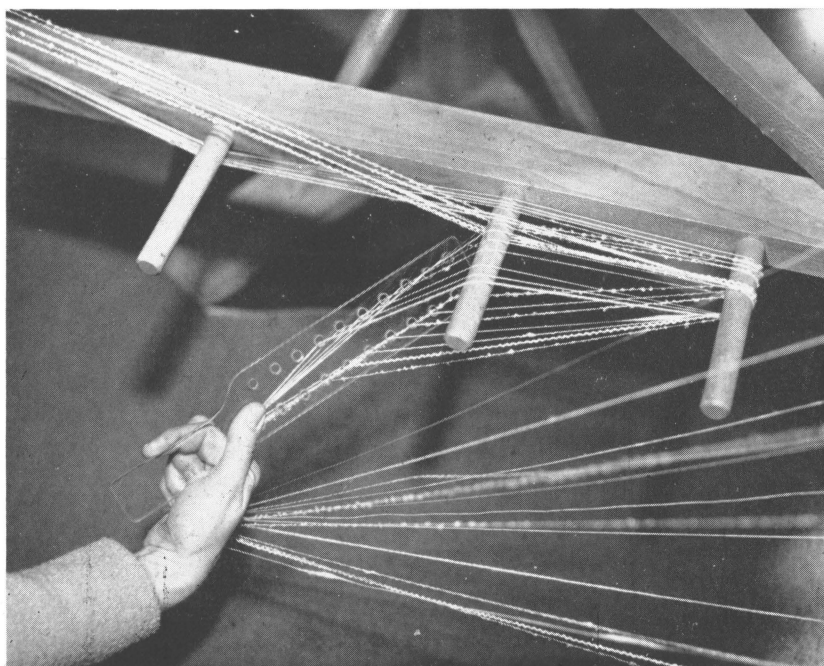


Fig. 5.10—Paddle passed around the end peg, ready to make the return cross. Note the wrist is turned to the right with Number 1 hole on top.

Fig. 5.11—Yarns in proper order for returning over the middle peg. Odd-numbered warp ends are on top, even-numbered on bottom, when an even number of ends are used in the paddle. If an odd number of ends are used, pick up the even-numbered ends and place them on top of the middle peg. Note the turned wrist.



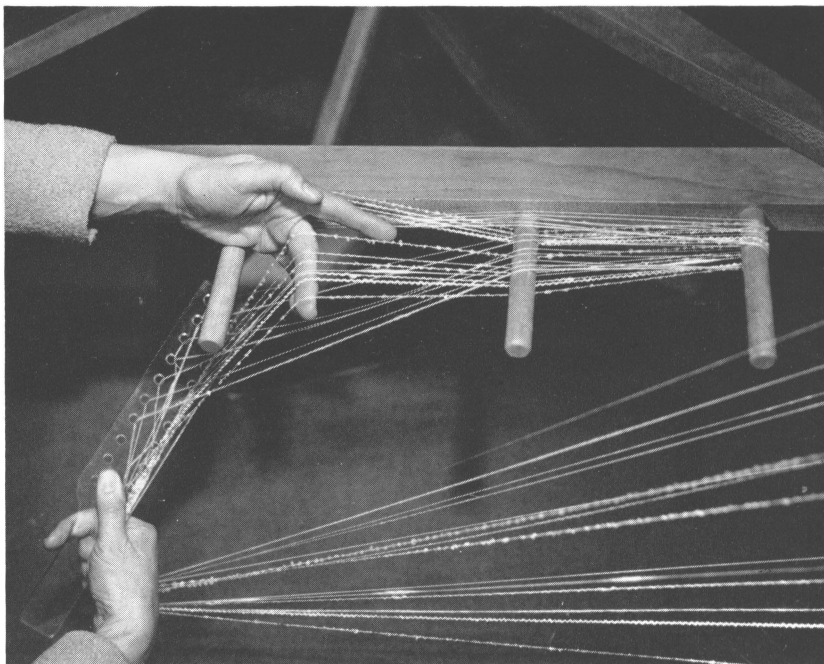


Fig. 5.12—Last peg on the return. When an even number of ends is used in the paddle, the even-numbered ones are picked up to pass over the peg, while the odd-numbered yarns will pass below. Note wrist still turned to the right. After slipping the yarn over this peg, the wrist is turned back to normal position.

On the second peg, to make the cross, the odd-numbered yarns are lifted so they can pass over the peg (Fig. 5.8). Pick up Number 1, go over Number 2, and pick up Number 3, lifting all odd-numbered yarns. These are slipped on the second peg (Fig. 5.9), and the weaver then passes all yarns over the last peg.

In turning for the return trip the wrist is turned to the right; this puts the paddle in position to make the return cross. Make sure not to turn the paddle in the hand. Figure 5.10 shows the paddle approaching the middle peg on the return.

At this point the weaver will consider the number of yarns he has in the paddle. If there is an odd number, the yarns on the bottom (with the wrist still turned to the right) are lifted over the center peg; if there is an even number, the yarns are in position and are merely slipped over the peg (Fig. 5.11).

The last peg on this return is governed by what was done on the



middle peg: to make the cross, the position of the yarns would be reversed. The yarns are then returned to the starting peg with the wrist back in normal position (Fig. 5.12) .

The weaver will have no difficulty with the paddle if he remembers that all yarns must be alternated over the pegs. This results in the separation of the individual yarns in the lease sticks in the proper sequence for threading through the heddles. This is but one of several ways the paddle can be used for warping. Familiarity with the appliance will suggest other ways it can be used to advantage.

A carefully planned and wound warp is the first essential in producing a good piece of weaving. Sufficient time should be allowed so that the winding is not hurried, counting can be done accurately, and the warp can be removed properly from the reel.