

Schacht Spindle Co. Rigid Heddle Loom

Instructions for Assembly, Warping, and Weaving



Shown with optional Trestle II Stand

Your rigid heddle loom has been crafted from the finest hardwood maple. Each piece has been sanded and hand-oiled. Each loom includes a rigid heddle reed with an 8-dent, 10-dent or 12-dent reed. (The “dent” size refers to the number of holes and slots per inch in the reed.) An optional floor stand is available for the 20” and 25” looms. Other helpful equipment includes: a warping board or a set of warping pegs, a threading hook, a stick shuttle, and a pick-up stick.

Assembly instructions

Parts List:

Wood Frame Pieces	1 Rigid heddle (8, 10, or 12-dent)
Left and right side pieces with heddle holders	2 – ratchet pawls
Warp beam with ratchet gear attached	2 – 1” round-head screws
Cloth beam with ratchet gear attached	2 – 1” flat head Phillips screws
Rear beam	4 – 1 3/4” flat-head Phillips screws
Front beam	2 – wooden crank handles
2 Lease sticks with holes in ends	8 – apron cords for 20” loom
3 Apron rods, no holes	or 10 – apron cords for 25” loom

Schacht Equipment and Weaving Supplies
available at

Elizabeth’s Fiber & Yarn

Buckley, WA 98321

253-826-0218

sales@fiber2yarn.com

www.fiber2yarn.com

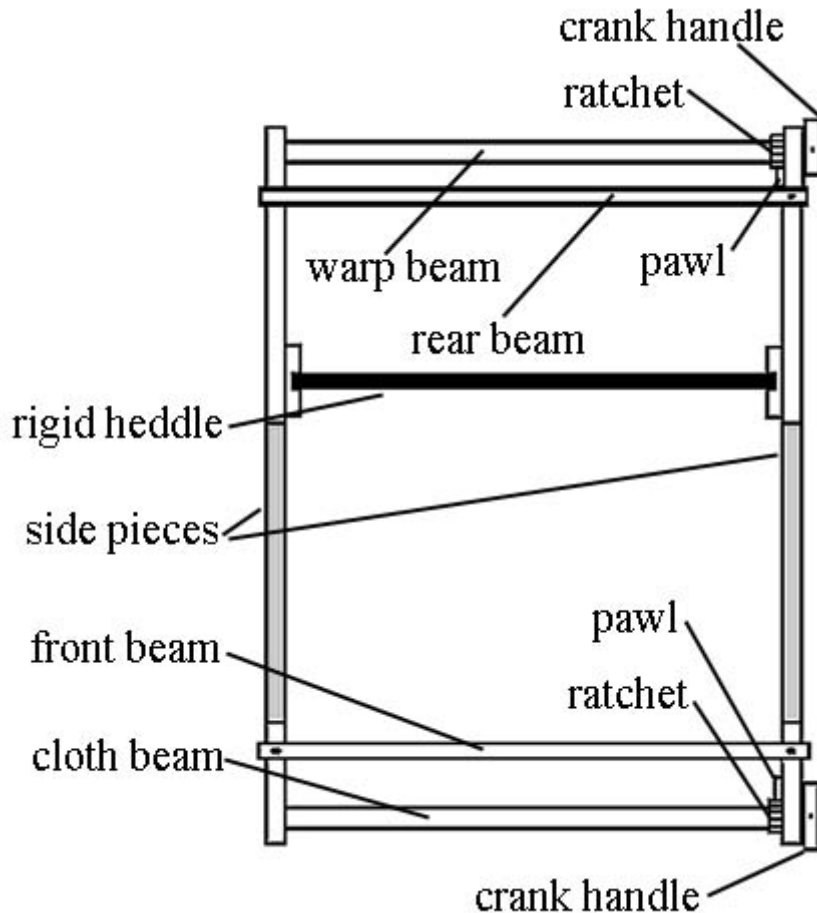


Diagram 1: Parts and Assembly

Assemble the Frame

Step 1. Lay the wooden pieces on a large, flat surface (follow Diagram 1). There are two ratchet pawls to be attached to the inside of the right side. Using two 1" round head screws, attach the ratchet pawls.

Step 2. Set the longer slim end of the cloth and warp beams in the holes on the left side piece. Next, slip the right side piece onto the the smaller slim end of the cloth and warp beams. Make sure that the ratchet pawls fall on the top of the ratchet gears.

Step 3. Place the front and rear beams in the curved slots on the top edge of the side pieces and secure them with the four 1 3/4" screws.

Step 4. Place the crank handles on the outer right-hand ends of the warp and the cloth beams. Line up the holes, and secure with the 1" screws.

Attach the Apron cords to the Beams

Step 1. Locate the pre-cut looped apron cords. There is one cord for each hole in the cloth and warp beams. To attach the apron cords to the beams, insert one end of the cord through a hole in the beam

and pull the cord through a few inches. Take the other end of the cord and put it through the second loop from the end that you put through the beam. Pull firmly on the cord to tighten it around the beam (Diagram 2A). Repeat this procedure across each of the beams.

Step 2. To attach the apron bar to the apron cords, start at one end of the beam with the outermost cord and work across. Fold the end of the looped cord at about 4" from the end and insert this doubled cord through the second loop from the end of the cord (Diagram 2B). Slide the apron bar through the loop formed by the doubled over cord at point X. Pull the cord tight (Diagram 2C). Repeat across the entire beam.

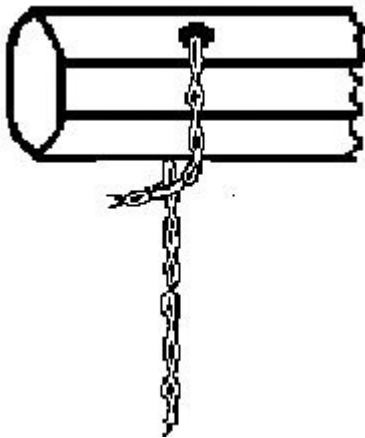


Diagram A

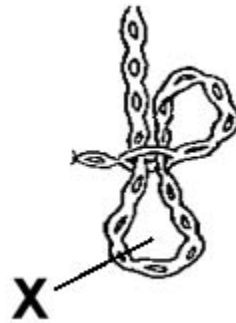


Diagram B

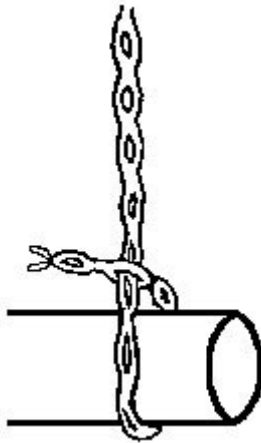


Diagram C

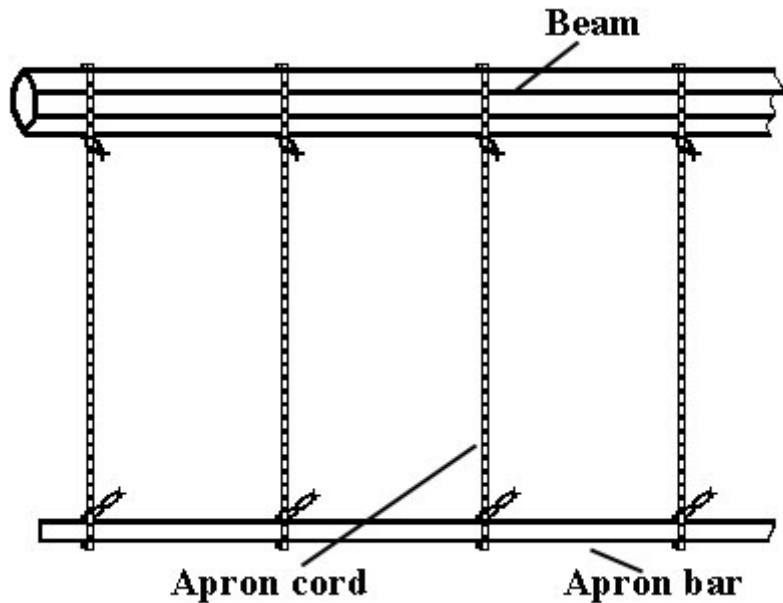


Diagram 2: Attaching Apron Bars

WEAVING

Weaving is the process of interlacing two sets of threads. One set, the warp, is held taut by the loom, and the other set, the weft, is woven perpendicular to, over and under, these warp threads. Your rigid heddle loom holds the warp threads tight so that the weft threads can be easily interlaced. The “rigid heddle” is designed to move the threads up and down so that the weft can be easily passed through the space between the threads. Here’s how it works: the loom is threaded so that the warp threads alternate through the slots and holes in the rigid heddle. When the heddle is raised the threads in the holes go up, while those in the slots remain level, forming the first of the two possible sheds. When the heddle is lowered, the threads in the holes move down below the threads in the slots, to form the second shed. The heddle is alternately raised and lowered, with a weft inserted through each shed each to produce an over, under, over, under interlacement of the weft with the warp. This weave structure is called “plain weave.”

GLOSSARY OF WEAVING TERMS

Balanced weave: Fabric in which the number of warp ends per inch (see e.p.i., below) approximately equals the number of weft ends (or picks) per inch (see p.p.i., below).

Beat: Pushing the weft threads into place with the rigid heddle.

Cross: The figure eight made at one end of the warp when measuring. It keeps the warp ends in order and helps prevent tangles.

E.p.i.: Ends per inch. The number of warp threads or ends per inch, determined by the number of slots and holes per inch on the rigid heddle.

Heddle holder: The notched block on inner face of both sides of the loom. Hold the heddle in upper position (in the notch) or lower position (under the block).

Loom waste: Warp yarn which is not usable at the start and end of each project because it is used to knot the warp onto the loom, or remains unwoven.

P.p.i.: Picks per inch. The number of shots or picks of weft per inch.

Plain weave: The most basic weave in which the weft is woven over and under, over and under, warp threads. Sometimes called tabby.

Rigid heddle: The device for making sheds in weaving which is made up of alternate slots and holes.

Selvedge: The very outside warp edge of the woven fabric.

Sett: The number of e.p.i. in a woven cloth.

Shed: The space between raised and lowered warps for the weft to pass through.

Shuttle: A tool for holding and carrying weft.

Sley: To thread the warp through the rigid heddle.

Tabby: See plain weave.

Take-up: The amount of warp length ‘lost’ during weaving. The warp, instead of going in a straight line, actually curves over and under the weft, and therefore extra warp yarn is required to allow for this take-up in every woven project.

Warp: The threads stretched on the loom, wound onto the warp beam and threaded through the rigid heddle; as a verb, the process of threading the warp onto the loom.

Warping board: A rectangular frame fitted with dowel posts, used to wind the required number of equal-length pieces of warp yarn in preparation for threading the warp yarn onto the loom.

Web: The woven cloth.

Weft: The thread or yarn which is passed across the loom, through the shed and thus woven

across the warp threads.

Weft-faced weave: An unbalanced weave in which there are many more picks per inch in the weft than ends per inch in the warp. Usually this is achieved by using a thin, widely spaced warp which is woven with a thick or soft, closely packed weft.

WARPING YOUR RIGID HEDDLE LOOM

Step 1. Calculating the amount of warp yarn required

You'll need to decide what you are going to weave, because the amount of yarn required depends on the size of the piece you plan to weave. Will it be a runner, a placemat, a scarf? Follow this recipe to calculate the warp you will need.

Quick Guide to Warp Calculations

Let's say you are going to weave a table runner that is 16" wide and 40" long.

A. Calculate the length of your warp: The length of the sample piece is 40", but you will also need additional warp length for tying onto the loom and other loom waste. The average loom waste is approximately 24". You should also add to this figure another 10% (= 4") for take-up, which is the amount of warp length 'lost' during weaving, and it is a good idea to add another 10% (=4") for possible shrinkage, when washing the fabric after weaving. Add these four numbers to get the total length required of the warp:

40" (length of piece)
24" (loom waste)
4" (take-up)
4" (shrinkage)
=72" or 2 yards (total length).

B. Calculate the total number of warp ends: To determine how many ends per inch (e.p.i.) you will need to count both the holes and the slots in one inch to determine the ends per inch. For this example, let's say you have a 10-dent reed and so you will set your warp at 10 ends per inch. Now multiply the width of your planned weaving times this e.p.i. to get the total number of warp ends.

In our example: 10 epi x 16" weaving width = 160 total ends of warp yarn.

C. Calculate the total amount of warp (in yards) needed.

Finally, to figure how much warp you will need to buy multiply the 160 total ends by 2 to get the length of each warp end, in yards.

Here's the simple formula (from steps B and C above):

Total warp ends x length of warp (in yds) = total yards of warp

Step 2. Calculating how much weft you will need

The amount of weft yarn you will need is determined by how firmly you pack your weft (or filler, or crosswise threads). For a balanced weave (the same number of warps per inch as wefts

per inch) buy the same amount for weft that you buy for warp. For a weft-faced weave (where weft packs tightly and covers the warp) buy more weft than warp, up to five times as much weft as warp for a weft-faced weave.

Step 3. Measuring your warp on a warping board

A. The guide string

After you've determined the dimensions and yarn requirements for your piece, you need to measure your warp before putting it on the loom. A warping board with pegs (see Diagram 3) is a handy tool for this. (You can also use a set of warping pegs, or even a picket fence!) To determine which pegs of the warping boards to use, cut a piece of string a few inches longer than you want your warp to be. Following Diagram 3, tie one end of the string to peg a. Carry it along the outer side of the top to peg b. From peg b carry the string across the board to peg c. Continue back and forth across the board as many times as necessary to lay down the length of your string, and end by wrapping around pegs d, e and end at f. This string, serves as a guide for the warp thread to follow.

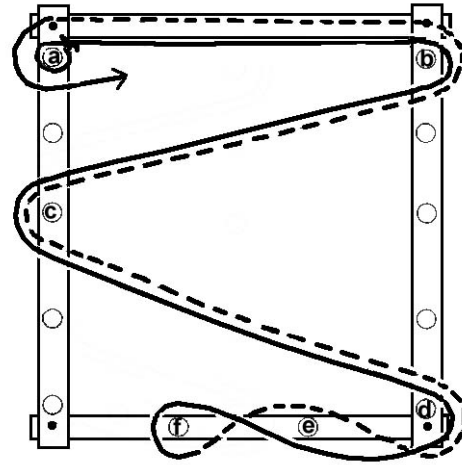


Diagram 3: Winding the warp

B. Winding the warp

Tie the end of the warp yarn to peg a. Carry the yarn along the path of the guide string until you reach the second peg from the end (peg e). Carry the yarn under e and over f. One warp thread has now been measured. To measure the second warp thread, carry the yarn around peg f and over e, and under d to form a figure-8 configuration (which is called the “cross” and serves to keep the warp ends in order and is needed for threading the loom, see step 5). From peg e follow the guide string under peg d and back up the warping board to peg a. Now, two warp ends have been measured. Continue measuring threads in this manner until you have measured your total number of threads.

Remember: from peg a to peg f, then back from peg f to peg a is two warp threads. Tie the last warp thread you measure to peg a.

C. Tying the cross and binding the warp

Before removing the warp from the warping board, tie the cross with a contrasting color tie, as illustrated in Diagram 4. Now cut several short pieces of string and bind the warp tightly at approximately 18" intervals. These "choke" ties keep the warp from tangling.

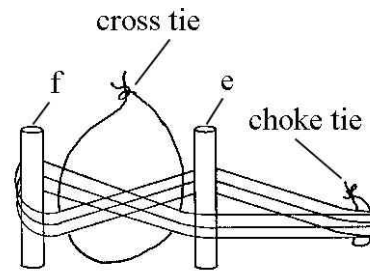


Diagram 4: Tying the cross

Step 4. Removing the warp from the warping board

Remove the warp carefully from the pegs and lay it out before the loom.

Step 5. Threading the warp through the rigid heddle

Place the rigid heddle in the slots of the heddle holder. Find the center of the rigid heddle. (You may want to make a permanent mark at the center of your rigid heddle since you will need to find it each time you warp your loom.) From the center, measure half the weaving width of the warp to one side, to determine the edge of your weaving. For our example of a 16" wide warp this will be 8" from the center point.



Diagram 5: Holding the Cross

Locate the end of your warp bundle which has the cross. Cut the warp loops at the cross end of the warp, and hold the cross on your hand, as shown in Diagram 5.

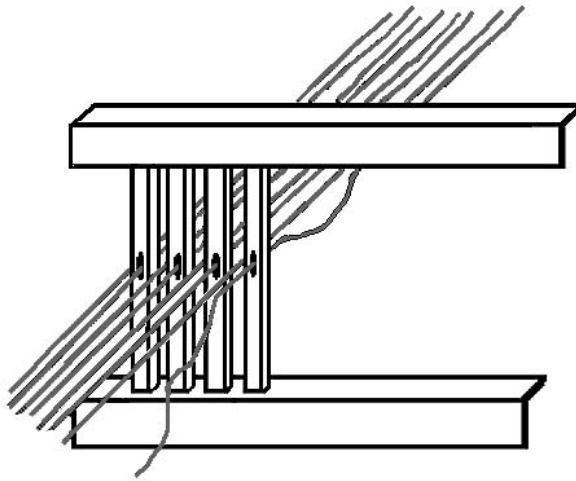


Diagram 6: Threading the rigid heddle

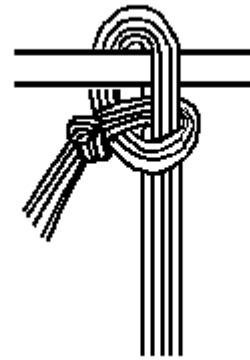


Diagram 7: Attaching warp to the back apron rod

Now look at the cross in your hand. Notice that the threads stack up Lincoln-Log style. Take the top end and place it through the slot which is to be the outermost edge of your weaving. A threading hook is a helpful tool. Now take the second end and thread it through the hole in the rigid heddle next to this first slot. Place the third end through the next slot and the fourth end through the next hole and so on. Continue across the entire warp width until all the ends have been threaded (Diagram 6). Tie overhand knots in warp-end groups of about 1". Then tie each group around the back apron bar and secure this knot by tightening it up to the first knot (see Diagram 7).

Step 6. Wind warp onto the warp beam

Remove the first small tie binding the warp. Holding the warp at the next tie, shake the warp until it is loose and even. Loosely wrap the warp bundle once or twice around the front beam to put a little tension on your warp during beaming (Diagram 8). Now, begin cranking the warp onto the warp beam by turning the beam clockwise. When the warp has been rolled around the beam once, insert heavy paper between the layers to keep the layers separated. The paper should be at least two inches wider than the width of the warp so that no threads slip off the edge of the paper as the warp is rolled on.

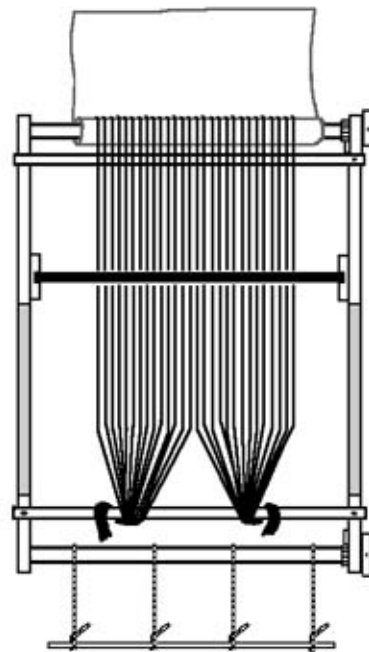


Diagram 8: Winding the Warp onto the Warp Beam

Continue rolling the warp and the paper onto the beam. Every so often stop cranking and pull hard on the warp chain to tighten the paper and warp on the back beam. Cut each binding tie heddle needed, and shake or comb the warp to relieve it of any tangles. Stop winding when the front end loops of the warp are about 10" from the rigid heddle.

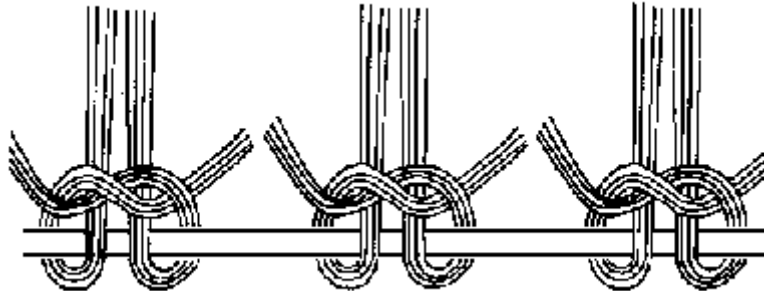


Diagram 9: Tying warp to front rod

Step 7. Tying the warp to the front beam.

Cut all the loops at the front of the warp. Bring the front apron rod around over the top of the front beam so that it is six inches from the rigid heddle. Take a 1" group of threads from the center of the warp and bring them around and over the top. Divide this group in half and tie as illustrated in Diagram 9. Tie 1" groups to the right and left of center alternately. When all groups are tied, tighten them until the tension on all the warp ends is even. Gently pat the warp ends to check that the tension is even. Tighten groups of warp if necessary, and tie the ends of each group in a bow.

WEAVING

You are now ready to weave. The two sheds are made by alternately resting the rigid heddle on the top of the heddle holder (raised shed) and by pushing the rigid heddle under the bottom part of the heddle holder (lower shed).

Before beginning your project, it is a good idea to weave in a “header”, with large weft: scrap yarn, toilet paper or rags. The purpose of the header is to spread the warp out evenly so that your weaving project can begin on an even, uniform warp. Usually three or four rows of heading material is sufficient. To weave in your header, place your rigid heddle in the raised-shed position, and pull your heading material through the open shed. Beat the first row in place by taking the rigid heddle firmly in both hands and pressing it forward, until it pushes the first row into a horizontal position, close to the front of the loom. Now place your rigid heddle in the lower shed position and bring your heading material back through to the other side. Again, use your rigid heddle to firmly pack the second row heading into place. Repeat these two rows several times, until your warp ends are evenly spread. Note: if you plan to have fringe on your woven piece allow for this length by weaving a few more rows of header.

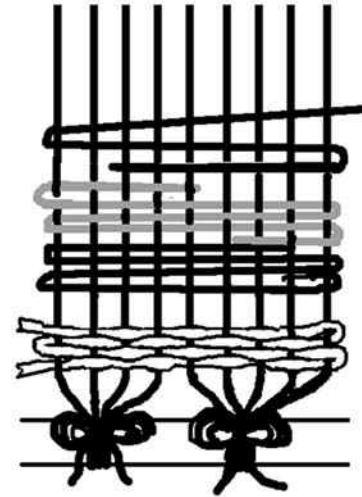


Diagram 10: Weaving

Wind your weft yarn for your weaving project onto a shuttle. Using a shuttle to carry your yarn back and forth across your warp enables you to weave more easily and for a long time without running out of yarn. Stick shuttles are recommended for rigid heddle weaving -- they are inexpensive and are easy to handle. To wind your shuttle make a figure eight from end to end. Wind just enough yarn on your shuttle so that it can pass freely through the open shed. You may wind both sides of your shuttle, or just one, depending on what feels most comfortable to you (see Diagram 11).

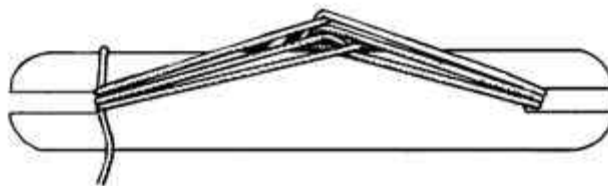


Diagram 11: Shuttle

Begin weaving your project with the shed which is the opposite of the last shed used for your heading. Take your wound shuttle and place it through the shed. To secure the tail end of your weft, place it around the very edge warp thread and back into the shed for an inch or so. Then beat the weft into place with the heddle. Change sheds by putting heddle in the opposite

position. Place the weft back through the shed, and beat the weft into place with heddle. Repeat these two rows. That's all there is to it! Pretty soon you'll find that all this comes automatically, almost without thinking.

There are lots of variations and manipulations, with color and texture and different kinds of yarn. Once you start seeing the possibilities, you'll discover that you will never run out of new things to try. That's what's fun about weaving.

FINISHING YOUR HANDWOVEN FABRIC

When you can't weave any further, or have finished your project, it is time to remove your weaving from the loom. Weave a few rows with a waste yarn such as the header fabric. This will hold your weft in place when you remove the fabric from the loom. Unwind your fabric from the cloth beam. Admire the results of your hard work. Untie the warp from the apron rods, or cut it close to the knots with a pair of scissors.

Inspect your fabric when you remove it from the loom. All loose ends should be secured. Look for weaving errors. If you have skips, you may cut out the weft from these areas and needle-weave a new weft into these areas, overlapping a bit on both sides so that the ends are secure. If you have broken ends, needle weave these ends in place.

Remove your header, and secure your warp ends. Usually this is done before washing your weaving. If you want to have fringe, you will want to tie the ends to prevent the weft from unraveling. One way to do this is to use overhand knots, overlapping ends from one group to another to make a tidy finish. Or you can hem your weaving. Before hemming you may want to zigzag stitch along the edge ends. Finally, wash your fabric and let it dry. Trim any ends which may have worked loose.

SOME WEAVING TIPS

Use your first project to get familiar with your loom. It is likely that there will be mistakes. You'll notice that your edges or selvages are crooked and that the weave is a little uneven. This is to be expected. Your next project will be better. Here are some tips and hints to help you along with the experience of learning to weave.

*For a nice even fabric, try to beat evenly with your rigid heddle.

*Eventually you will run out of weft on your shuttle. You can tuck the tail end in the next row of weaving for an inch or so; or you can let the end leave off where it happens to end and overlap the new end with old end. (See Diagram 10)

*If you are finding that it is hard to move your heddle up and down, your tension may be too tight, although you want to have a fairly taut tension on your loom so that your weft will pack in nicely. The tension on your loom can be tightened by simply cranking the handle on the warp beam, and loosened by raising the ratchet pawl on the cloth beam and letting the ratchet fall back a couple of notches. Play around with this and see what it does to your warp and weaving.

*At some point a warp end may break. This can be easily fixed by simply tying on a new end to the broken one, rethreading the end through a slot or hole and securing the end to your fabric by making a figure eight over a T-pin. The loose ends of warp can be sewn into the fabric after you've removed your weaving from the loom.

*One thing you will notice as you first begin to weave is that your selvages pull in. You can correct this problem by allowing some extra weft in each shed. To place extra weft, use the

technique of slanting or bubbling the weft to minimize this

*As you weave, your weaving will grow closer and closer to the heddle and your shed gets smaller which makes it harder for the shuttle to fit through. This means it is time to advance the warp. First loosen the back pawl and allow several inches of warp to fall forward. Replace the back pawl and crank the front beam counter-clockwise to advance the warp. Be sure that your warp doesn't move too far forward and prevent you from being able to beat the weft in. Should this happen, simply reverse the process. Pat across your warp to check to see that it is the same tension as it was before, and adjust your tension if necessary.

MORE READING

Davenport, Betty. Hands on Rigid Heddle Weaving, Loveland, Colorado, Interweave Press, Inc., 1987

Periodicals

Handwoven, Interweave Press, Inc., 306 N. Washington Avenue, Loveland, CO 80537

Fiberarts—Lark Communications, 50 College Street, Asheville, NC 28801.

Shuttle, Spindle and Dyepot—Handweavers Guild of America, 2 Executive Concourse, Suite 201, 3327 Duluth Highway, Duluth, GA 30096

APPENDIX: HOW TO DETERMINE E.P.I.

The greater the yarn size, the fewer warp ends per inch will be needed. But how do you know exactly how many ends there should be for a firm, but not flimsy, fabric? Some of this comes from experience, and if you ever have a question about how you should set a yarn, you can always do a sample first before beginning. There is also a rule of thumb which is quite useful in giving you an idea of how a yarn should be set: Simply wind the yarn you want to use as warp around a ruler for 1/2", winding the yarn so that there are no spaces between wraps. Now count the number of wraps in this 1/2" and multiply by two for the number of ends per inch. Your shopkeeper can be helpful in helping you choose the right yarn for the project you have in mind.

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