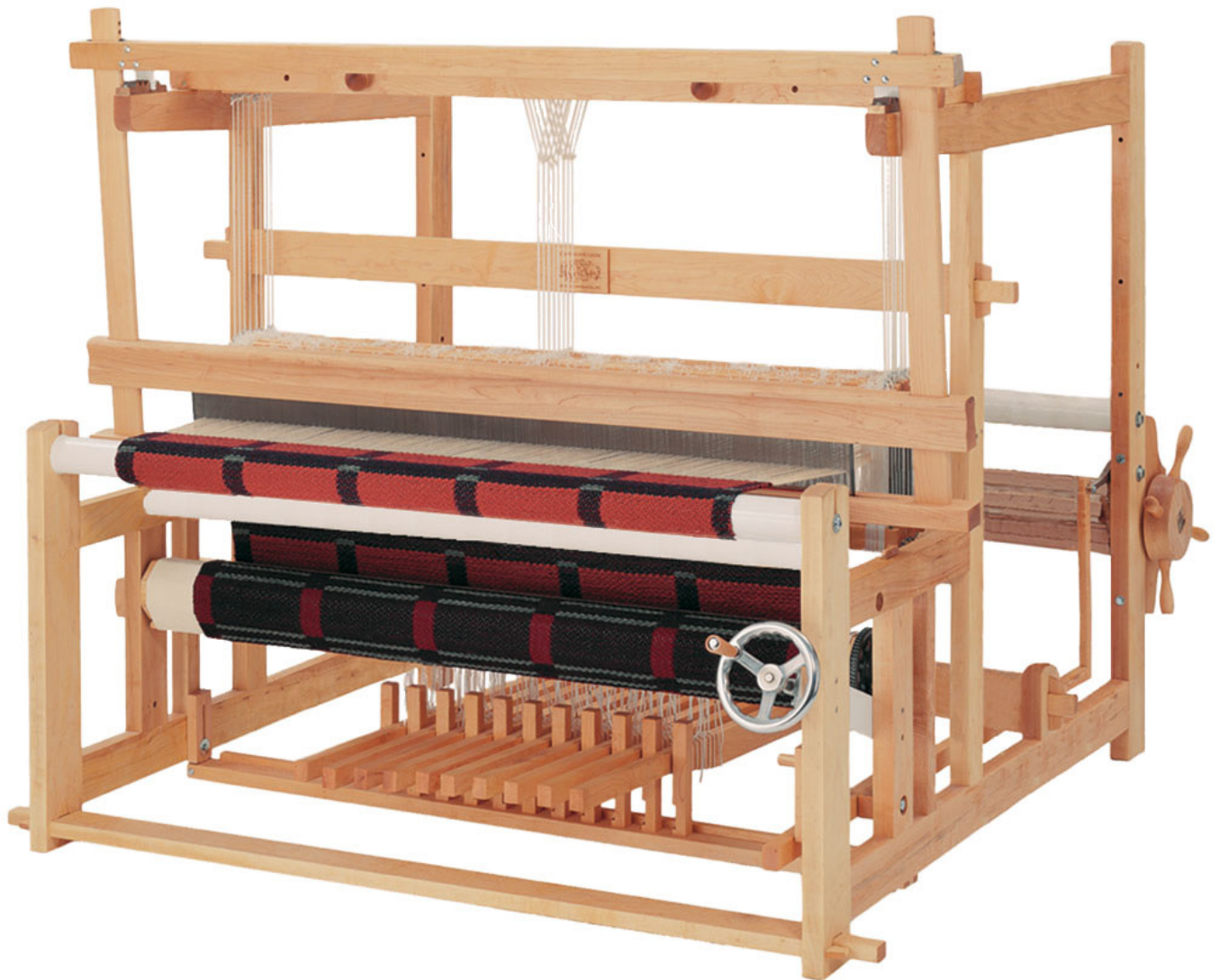


CRANBROOK LOOM

ASSEMBLY MANUAL



Find out more at schachtspindle.com
Schacht Spindle Company 6101 Ben Place Boulder, CO 80301
303.442.3212

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4- AND 8-SHAFT CRANBROOK LOOM PARTS

TOOLS REQUIRED

7/16" wrench
7/16" ratchet
9/16" wrench
3/4" ratchet
3/4" wrench
#2 Phillips screwdriver
rubber mallet
slotted (flat) screwdriver
metal tape measure

DEFINITIONS

The beater is at the front of the loom. The brake and worm gear are on the right side of the loom.

Mortise: A hole or cavity cut in a piece of wood prepared to receive a similarly shaped piece.

Tenon: A projection on the end of a piece of wood designed to fit into a hole or cavity of the same shape.

HARDWARE

Some hardware is already attached to the parts. Other hardware has been packaged in labeled bags for the parts they go with. You'll also find two Allen wrenches (sizes 5/16" and 5/32") in a hardware bag.

SMALL PARTS

4-shaft quantity	8-shaft quantity	12-treadle option quantity	
24	80	96	anchor pegs
24	80	96	tie-up cords (tied bundles of 12 each)
10	10	10	bundles of Texsolv heddles (1,000 total)
4	8	8	center support dowels
8	16	16	long metal shaft pins
8	16	16	short metal shaft pins
8	16	16	metal sleeves

LOOM PARTS

Parts are illustrated on the next page unless otherwise indicated.

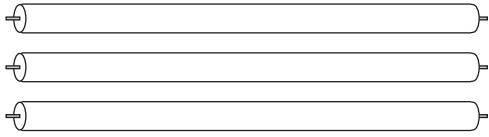
4-shaft	8-shaft	
Box 1		
1	1	right frame side with pivot block, brake hold & peg attached (shown on page 5)
1	1	left frame side (shown on page 5)
Box 2		
1	1	cloth beam
1	1	warp beam
3	3	steel beams with hardware attached
1	1	warp beam wheel
Box 3 and/or 4		
1	1	stainless steel reed (not shown)
16	16	wooden packing sticks (not shown)
2	2	lease sticks (same as packing sticks, but with holes; not shown)
3	3	cross beams: front and middle, rear with treadle support bar
6	6	wedges for cross beams
1	1	treadle separator beam with hardware attached
1	1	jack box with cords attached
2	2	warp beam hanger blocks with sliding locking blocks attached
6	10 (or 12)	treadles
1	1	lower lamm assembly with extension blocks attached
4	8	shaft tops
4	8	shaft bottoms
4	8	upper lamms
1	1	brake release pedal and connector strut
2	2	beater uprights
1	1	beater race
1	1	beater top
1	1	beater swing bar
Box 4 or 5		
1	1	worm gear



cloth beam



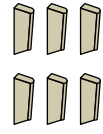
warp beam



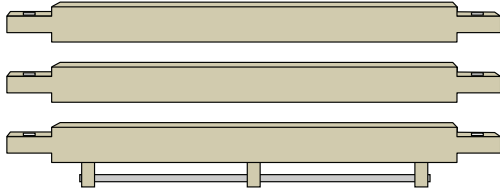
steel beams



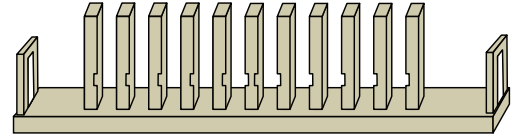
warp beam wheel



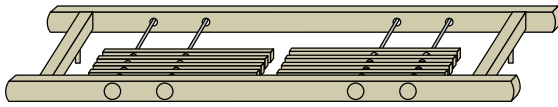
wedges



front & middle cross beams,
rear cross beam with treadle support bar



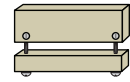
treadle separator beam



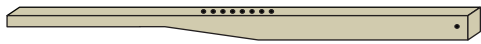
jack box (cords not shown)



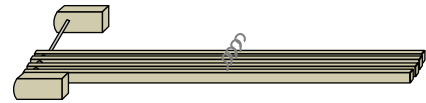
warp beam hanger blocks



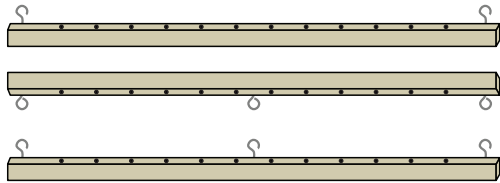
dust tray



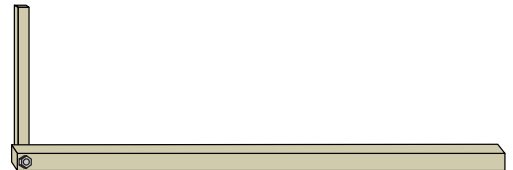
treadle



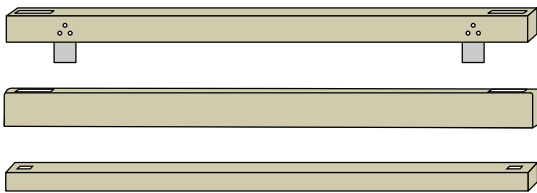
lower lamm assembly



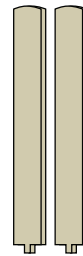
shaft top, shaft bottom & upper lamm



brake release pedal & connector strut



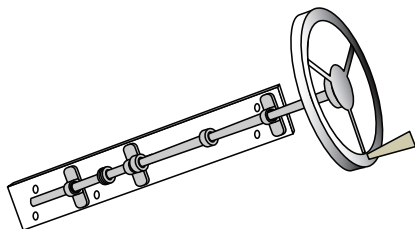
beater swing bar, beater top, beater race



beater uprights



brake hold & peg



worm gear

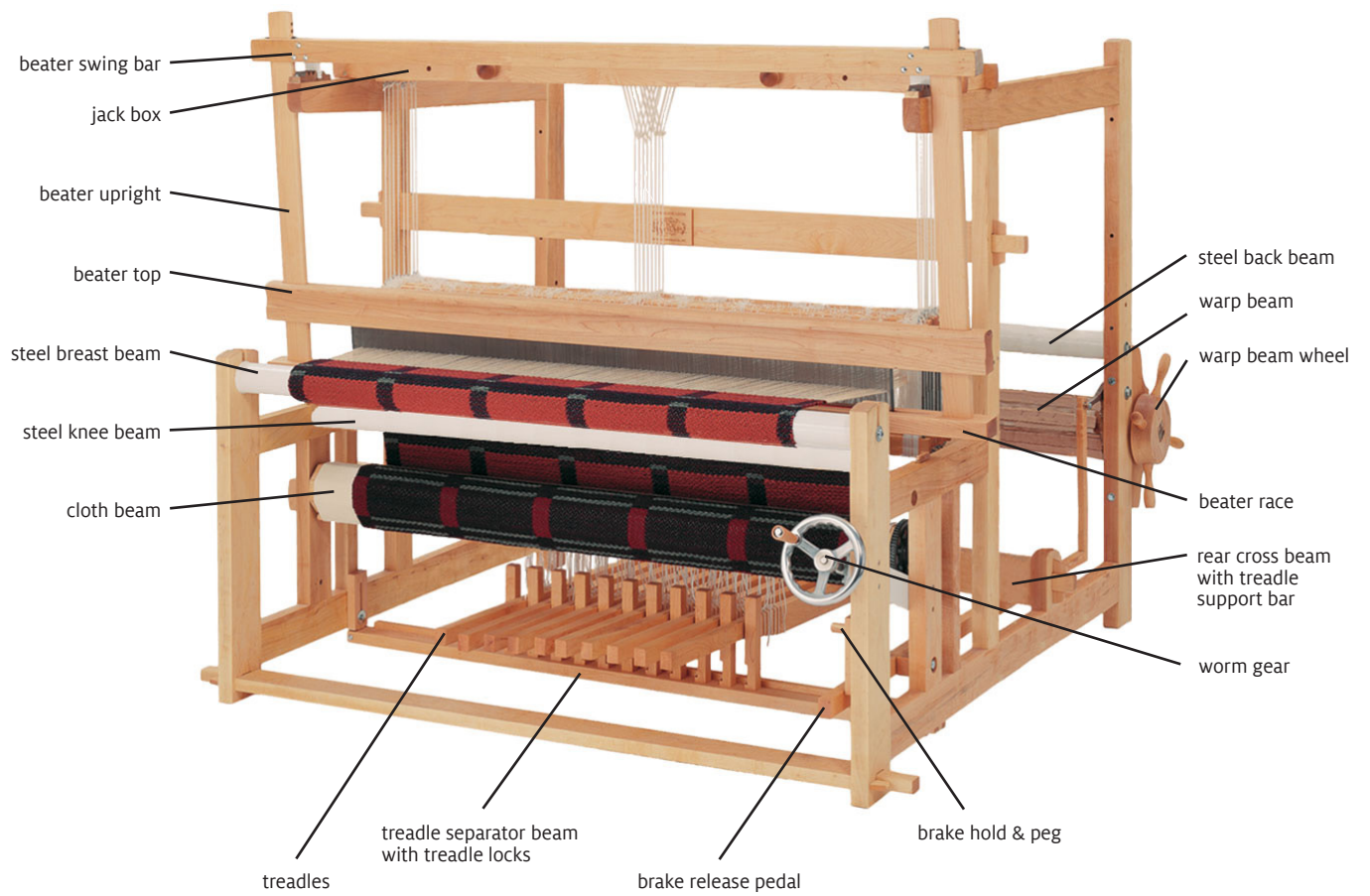


FIGURE 1: OVERVIEW OF THE CRANBROOK LOOM

CRANBROOK LOOM

ASSEMBLY INSTRUCTIONS

Before you begin assembling your loom, check to see that you have everything by comparing parts to lists and illustrations on pages 2–4. Because some of the pieces are quite large, the assembly will be easier when done with another person (the 72" loom may require three people for assembly). Assemble the loom in place, as it is difficult to move once assembled.

It is important to keep the loom frame square when you assemble it. This means that the loom sides and cross beams are at right angles to each other. After the preliminary assembly, and before you tap the wooden wedges tightly into place, you will make a series of measurements to verify that the loom is square (see “Squaring the Loom” on page 7).

ASSEMBLE THE FRAME

Parts: 2 frame sides, 3 cross beams, 3 wooden wedges

In the right frame side, insert the rear cross beam (note: the metal treadle support bar should face down) and the front cross beam in their mortises (Figure 2). Now insert the middle cross beam in the right side frame, and at the same time bring the left side frame into place and support all three cross beams (not fully inserted) on the left side.

Attach the three cross beams to the right side by tapping a wooden wedge into place in the slot in each cross beam on the outside of the right frame. Do not secure the cross beams on the left frame side at this time, since you still need to allow for space to insert the cloth beam later.

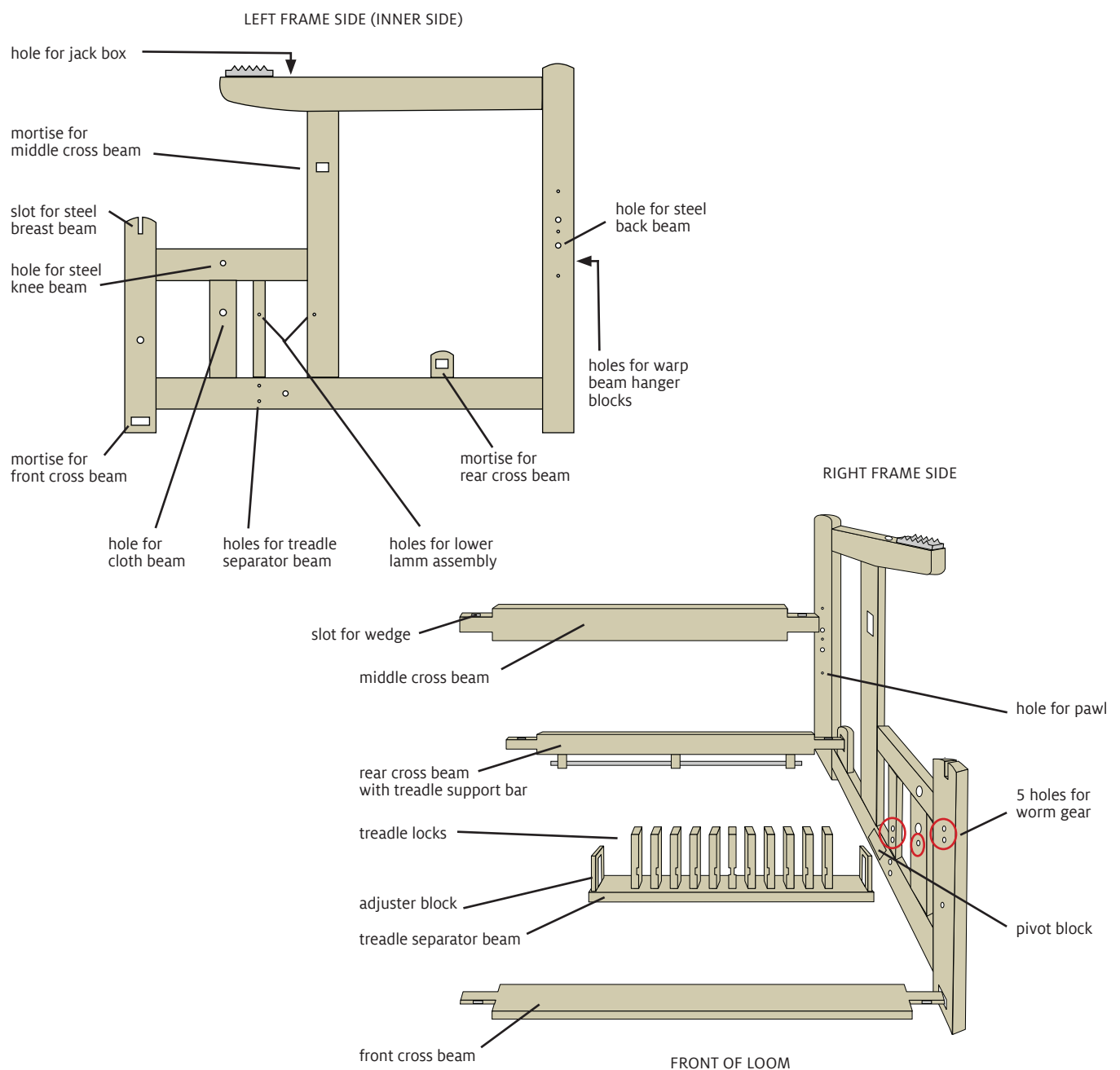


FIGURE 2: FRAME ASSEMBLY

INSTALL THE BRAKE HOLD PEG, WORM GEAR & CLOTH BEAM

Parts: brake hold peg, worm gear assembly, cloth beam, 3 wooden wedges

Hardware: 1X #12 x 1-1/2" Phillips truss head sheet metal screw, 5X 1/4-20 x 2-1/2" Phillips truss head machine screws; 5X 1/4" lock washers; 5X 1/4-20 lock nuts

The right frame side should have the wedges loosely set through all cross beams. The left frame side must have only the cross beams partially inserted without wedges. You will need a helper to be sure that the left frame side without wedges does not fall.

On the outside of the frame, insert one #12 x 1-1/2" Phillips truss head sheet metal screw through the hole in the right front upright. From inside the frame, attach the brake hold upright with this screw.

On the outside of the frame, insert five 1/4-20 x 2-1/2" Phillips truss head machine screws into holes 1 through 4 and the slot (Figure 3). Place the worm gear assembly over the screw shafts, then add a 1/4" lock washer and secure with a 1/4-20 lock nut. Pull the worm gear crank handle towards you up to the shaft collar stop.

Carefully place the cloth beam between the frame sides on the floor, or support it on a stool or low chair so that the axles remain below their pivot holes. Install a 1" flat washer on

both axles. Insert the cloth beam end into the 1" hole in the right frame side. At the same time, push the left frame side toward the right side. Guide the left cloth beam axle into its corresponding 1" hole.

Secure the left frame side by placing the remaining three wood wedges in the cross members. Tap all the wedges gently but firmly to bring the cross braces against the frame sides.

Before continuing, check that the cloth beam spins freely: Disengage the worm gear. If the cloth beam does not turn freely, you will have to remove the cloth beam and remove the washer from the axle on the left side to provide more space.

To engage the worm gear with the worm, push the worm gear handle toward the back of the loom and turn it clockwise at the same time. Turning the handle clockwise advances the warp and provides tension. When weaving is complete or tension must be released, turn the handle counterclockwise. When the tension is released, the worm gear can be disengaged by pulling the worm gear handle towards you the as far as it can go. The cloth beam will now turn freely. *Tension must be released before the brake release pedal can be operated.*

SQUARING THE LOOM

Measure the diagonal distance from an inner edge of the left front upright (A on Figure 4), to an inner edge of the right rear upright (A1). Record this distance.

Measure the distance from the inner edge of the right front upright (B) to the inner edge of the left rear upright (B1). Record this distance.

If the distances are the same, the loom is square. If one distance is greater than the other, remove the wedges on the left side and move the left side frame forward or backward until the distances are the same. Then reinsert the wedges and tap them into place.

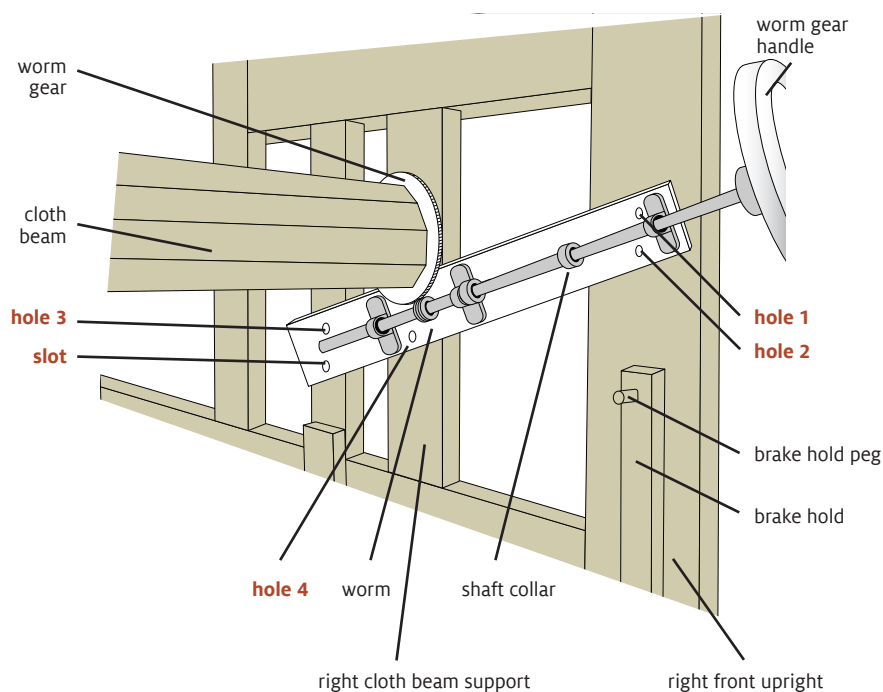


FIGURE 3: WORM GEAR

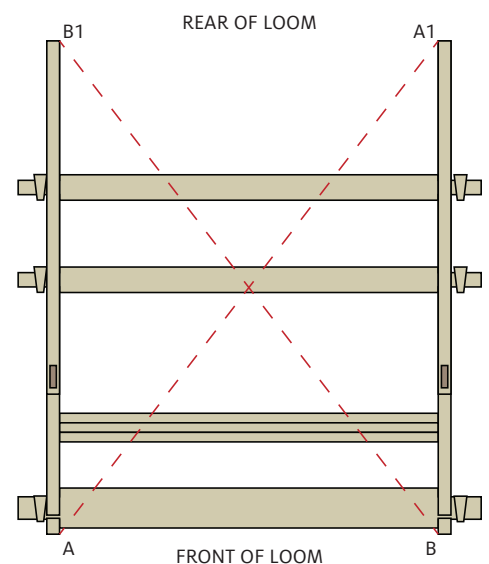


FIGURE 4: SQUARING THE LOOM

INSTALL THE TREADLE SEPARATOR BEAM

Parts: treadle separator beam

Hardware: 4X 1/4-20 x 3-1/4" hex bolts; 8X 1/4" flat washers; 4X 1/4-20 lock nuts

Place the treadle separator beam on the floor between the sides with the reinforcing bar facing the back of the loom. Line up the two holes on the side of the loom with the adjuster block slots (see Figure 2, page 6). Working from the outside, secure each side with two 1/4-20 x 3-1/4" hex bolts in this order: hex bolt, 1/4" flat washer, side frame, 1/4" flat washer, lock nut. The adjuster bar slots make it possible to set the treadle separator beam at different heights, ensuring uniform and maximum sheds.

INSTALL THE TIE-UP CORDS ON THE TREADLES

Parts: treadles, tie-up cords

Treadles have flat tops and tapered bottoms. Take the end of the tie-up cord farthest from the red and black marks, and thread it through a hole from the top of the treadle (Figure 5A). Loop the cord around the edge of the treadle, then insert the long end through the first full-size hole of the threaded end (Figure 5B). Center the cord over the treadle hole and tighten. The cords should all be looped around the same side of the treadle. Install tie-up cords for all the holes in each treadle.

INSTALL THE TREADLES ON THE TREADLE SUPPORT BAR

Parts: treadle support bar and hardware (inserted through support blocks on the rear cross beam); treadle spacers; wooden washers (12-treadle looms only)

Remove both cotter pins from the treadle support bar. Slide the treadle support bar out to one side of the three support blocks (Figure 6).

Install treadles for your loom as shown in Figure 6A (6-treadle looms), 6B (10-treadle looms) or 6C (12-treadle looms). Working from the center support block outward, slide half the treadles—making sure the flat sides of the treadles face up—and wooden spacers onto the treadle support bar. Then install the remaining treadles and wooden spacers on the other side of the support bar, again working out from the center support block. When all treadles and spacers have been installed, secure both ends of the treadle support bar with wood washers (for 12-treadle looms only) and cotter pins (all looms).

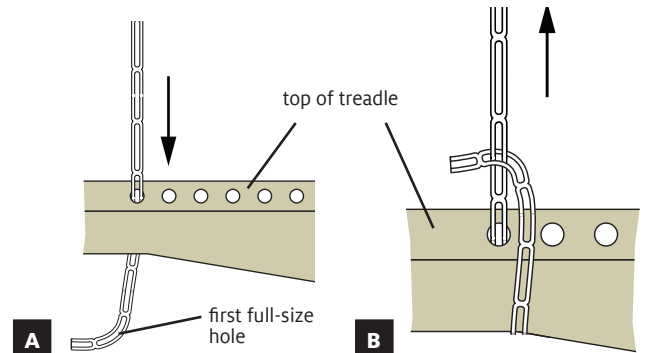


FIGURE 5: INSTALLING TIE-UP CORDS

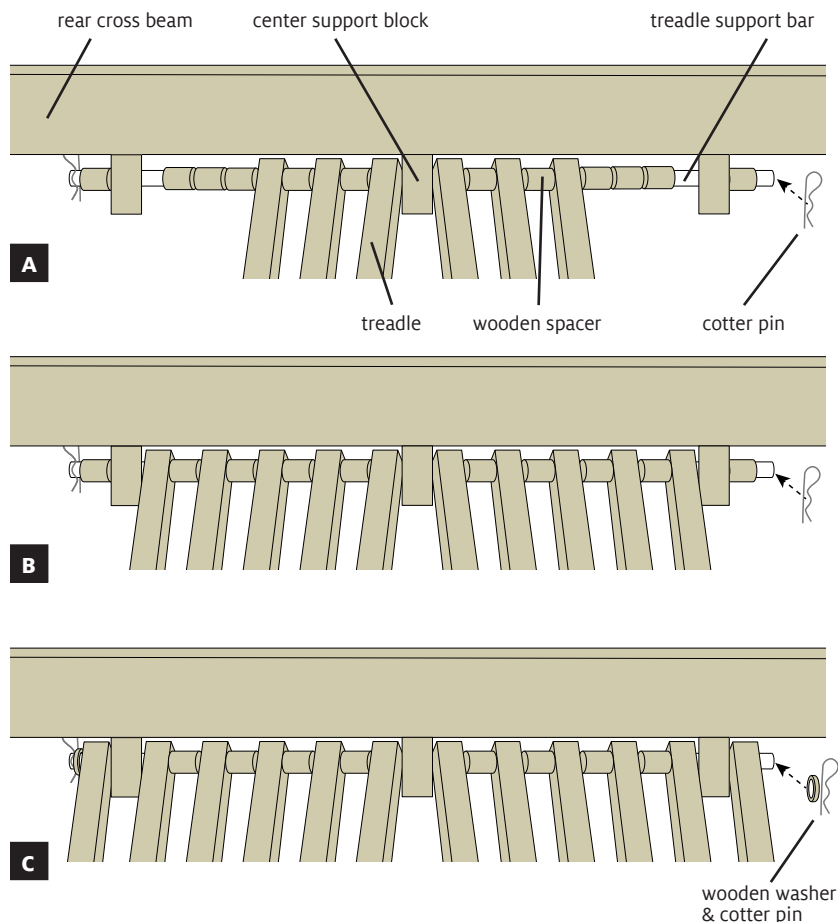


FIGURE 6: INSTALLING TREADLES

ATTACH THE LOWER LAMM ASSEMBLY

Parts: lower lamm assembly

Hardware: 2X 3/8" x 3-1/2" hex bolts; 2X 3/8" flat washers; 2X 3/8" barrel nuts

Leave the wrapping materials in place until you have attached the lamms. Make sure the hooks on the lower lamms face up. From the inside of the left frame side, insert 3/8" x 3-1/2" hex bolts and 3/8" flat washers into the two holes for the lower lamm assembly (see Figure 2, page 6). Insert a 3/8" barrel nut into each extension block. Slide the extension blocks over the hex bolts, turning the barrel nuts if needed. Tighten the hex bolts securely.

INSTALL THE STEEL BEAMS

Parts: 3 steel beams with attached hardware

Breast Beam: The breast beam fits into the slots at the top of the front uprights (see Figure 2, page 6). Remove the hardware so you can remove the packing materials. Insert each 3" button head bolt through a fender washer and then through the large flat washer. Attach the bolts into each end of the beam, securing them about 1/2" deep. Position the beam with the bolts over the slots in the front uprights, with fender washers on the outside of the frame and large washers on the inside. Slide the beam down to the bottom of the slots. Tighten the bolts by hand, then use the large allen wrench to secure as tightly as possible.

Back Beam: The back beam fits in the fourth hole from the top in the rear uprights of the side frames (see Figure 2, page 6). (Holes closer to the top accept an optional double warp beam and optional tension box rail.) Attach one end of the back beam at a time. Insert a 3" button head bolt through a fender washer, then through the frame side, then through the large flat washer. Do not push the button head bolt all the way through the washers and frame side. Have a helper raise the back beam into position as you align the bolt and the hole in the beam. Tighten the bolts loosely at this point. Repeat on the other side of the loom.

Knee Beam: The knee beam fits into holes in the side frames directly above the cloth beam. This beam allows for additional leg room within the loom, because woven material passes over

the top of the knee beam to the cloth beam below. Install the knee beam in the same way as the back beam.

Once the back and knee beams are installed, tighten all steel beam bolts with the large allen wrench. Tap all six wedges for the three wooden cross beams firmly into place again.

INSTALL THE JACK BOX

Parts: jack box

Set the jack box on the top of the loom, lining up the pegs in the bottom of the jack box with the holes on the top of the frame sides (see Figure 2, page 6). The wooden knobs of the jack pivots and locking pins should face the front of the loom, and all cords should hang down (Figure 7). Take care that the locking pins do not fall out as you maneuver the jack box into place.

ASSEMBLE THE SHAFTS AND INSTALL THE HEDDLES

Parts for each shaft: 1X shaft top with 2 hooks, 1X shaft bottom with 3 eyes, 1X wooden support dowel, 2X long metal shaft pins, 2X short metal shaft pins, 2X metal sleeves, heddles

Do not remove the twist ties from the heddles until you read the following instructions.

Each heddle bundle contains 100 heddles. The heddles are linked together in a continuous string of heddles. It is safest to cut the heddles apart only after heddles are installed on the shafts.

You may need to cut apart some heddles before this if you want to separate part of the bundle. First, determine how many heddles you need on each shaft. Then divide this number in half, to determine the number needed on each side of the shaft. Place the whole bundle of heddles on two extra sticks such as lease sticks (inserted at the space between the twist ties). Now undo the twist ties and count out the heddles you need. Then re-tie both bundles of heddles separately with 4 extra twist ties per bundle.

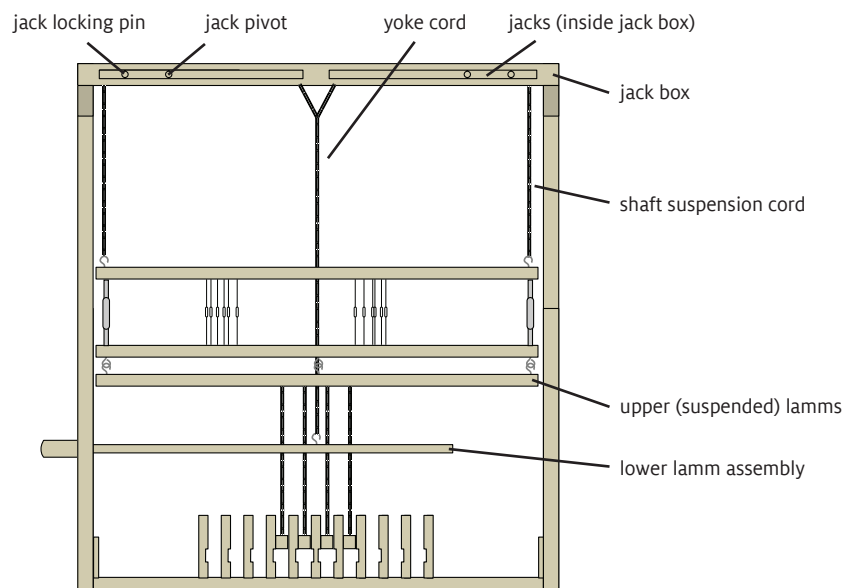


FIGURE 7: JACK AND LAMM ASSEMBLY

Installing the heddles and assembling the shafts is done simultaneously. Follow this procedure exactly to avoid breaking the wooden support dowel.

Insert a wooden support dowel in the center holes of the shaft top and bottom and tap firmly into place (Figure 8). Take care when installing the heddles that the wooden support dowel does not come out, because it cannot be replaced after the heddles are installed.

First install the heddles on one side of the center support dowel, sliding them over the hooks and eyes on the shaft top and bottom. Cut the heddles apart by cutting the loops at the very top and bottom of the heddles, and slide them all the way to the center. This positioning will help in moving the heddles across the shaft and with installing the heddles on the other side of the shaft. Then install the heddles on the other side of the center support dowel, cut them apart, and slide them to the center of the shaft.

Place the shaft pins and metal sleeves in position at each end of the shaft. Insert the long metal shaft pins in the holes in the shaft top. Insert the short metal shaft pins in the shaft bottom holes. Slide a metal sleeve onto the long metal shaft pin, and slip it down over the short metal shaft pin to secure the shaft side. Repeat on the other side of the shaft. If the heddles are tightly stretched between the top and bottom shaft bars, tap the top of the shaft firmly with a rubber mallet, at the center and two sides, to compact the frame (Figure 8).

When each shaft is assembled, hang an upper lamm on it by interlocking the three eyes on the shaft bottom with the corresponding hooks on the lamm (see Figure 7, page 9). Beginning at the rear of the loom, hang each shaft in the 10th hole (marked in green) of each of the shaft suspension cords. For 4-shaft looms, the shafts should be installed in the four forward spaces.

Attach the corresponding lower lamm at the 12th hole (blue mark) of the yoke cord. The yoke cord should be in back of its corresponding shaft. The top of the shaft top will be approximately 42-1/2" to 43" from the floor.

INSTALL THE PAWL

Parts: pawl with attached hardware

Install the pawl on the right rear upright, on the inside of the loom, in the 1/2" hole below the steel back beam (see Figure 2, page 6). The hook on the pawl faces the rear of the loom as shown in Figure 9. Thread the 1/2" x 3-1/4" hex bolt through a 1/2" flat washer, then through the pawl hole from the outer side of the frame. On the inner side of the frame, add the following hardware as shown in Figure 9: 1/2" flat washer, slim lock nut, pawl, 1/2" flat washer, slim lock nut.

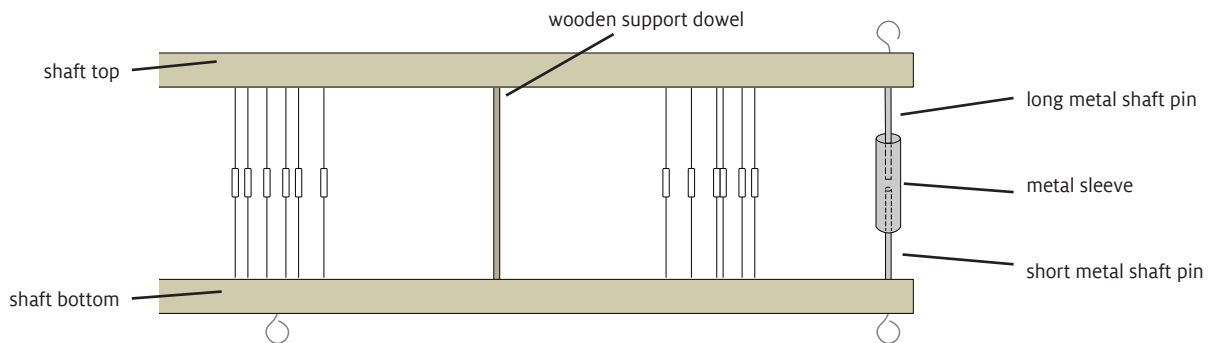


FIGURE 8: SHAFTS AND HEDDLES

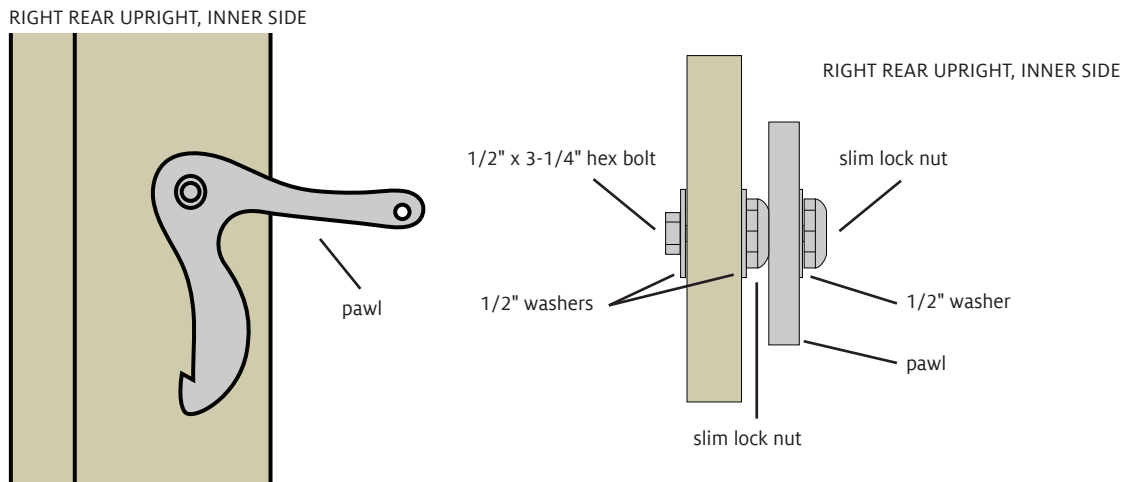


FIGURE 9: PAWL HARDWARE

INSTALL THE WARP BEAM HANGER BLOCKS AND WARP BEAM

Parts: 2 warp beam hanger blocks, warp beam with attached nylon washers, warp beam wheel

Hardware: 4X 3/8" barrel nuts; 4X 3/8" flat washers; 4X 3/8" x 6" hex bolts

Locate the four 3/8" holes in the back side of each rear upright. You will install the warp beam hanger blocks on the lower two holes of each upright. (The upper two holes are for installation of an optional double warp beam.)

Install a warp beam hanger block on the rear upright: insert two 3/8" barrel nuts into the holes in the hanger block. Place a 3/8" flat washer on each of two 3/8" x 6" hex bolts, then insert the bolts through the rear upright from the front side. Orient the hanger block so that the slotted ends of the barrel nuts face to the inside of the loom, then attach the hex bolts into the barrel nuts. (This orientation allows the beam lock blocks to slide to the outside when the hanger blocks are installed.) Repeat this step with the remaining warp beam hanger block.

Install the warp beam: remove the locking pegs from each hanger block and slide out the lock blocks. On each end of the warp beam, remove the tape holding nylon washers in place but do not remove the washers. Insert the beam into the hanger blocks and replace the lock blocks and pegs. From the outer side of the loom, place the warp beam wheel over the square shaft of the warp beam (Figure 10).

INSTALL THE WARP BEAM BRAKE RELEASE

Parts: brake release pedal and connector strut

Hardware: 1X 1/2" x 5-1/2" hex bolt; 3X 1/2" flat washers; 1X 1/2" lock nut; 1X 1/4" x 1-3/4" hex bolt; 3X 1/4" flat washers; 1X 1/4" lock nut

Locate the pivot block on the inside of the right frame side (Figure 10). The block is on the lowest horizontal side brace, just to the rear of the treadle separator beam.

Place the brake release pedal **above** the front cross beam and the treadle separator beam, and **under** the back cross beam with the connector strut to the rear of the loom. Orient the assembly so that the connector strut lies next to the loom side (Figure 10), between the brake release pedal and the loom side. Bolt the assembly in place at the pivot block, working from the outside of the loom frame in this order: 1/2" x 5-1/2" hex bolt, 1/2" flat washer, frame side, pivot block, two 1/2" washers, pedal, two 1/2" flat washers, and 1/2" lock nut. Tighten securely but allow the pedal to move freely.

Attach the connector strut to the pawl with a 1/4" x 1-3/4" hex bolt, bolting from the inside as follows: hex bolt, 1/4" washer, connector strut, two 1/4" washers, pawl, 1/4" washer, 1/4" lock nut. Tighten securely but allow the connector strut to move freely.

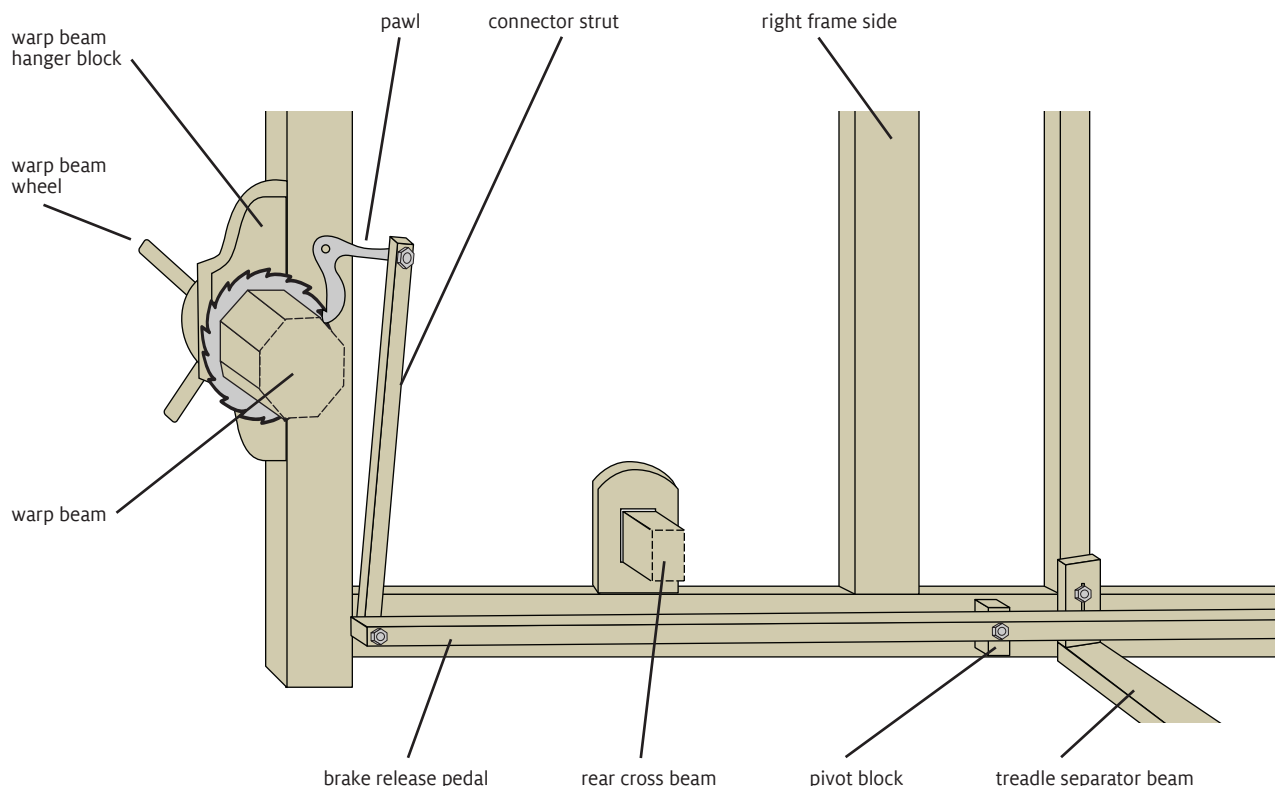


FIGURE 10: WARP BEAM AND BRAKE RELEASE ASSEMBLY

ASSEMBLE THE BEATER

Parts: beater swing bar, beater top, beater race, beater uprights

Hardware: 4X 1/4-20 barrel nuts; 4X 1/4-20 x 3" button head bolts; 4X 1" fender washers; 2X 3/8" x 4" metal locking pins

Working on the floor, assemble the beater uprights to the beater race: insert a 1/4-20 barrel nut into each hole at the tenoned end of a beater upright. Insert the tenon into the mortise of the beater race. Attach the upright with two 1/4-20 x 3" button head bolts inserted through two 1" fender washers, then screwed into the barrel nuts with the smaller allen wrench provided. Repeat for other upright on the other end of the beater race. Now slide the beater top onto the uprights. Place the reed in the slot of the beater race and slide the beater top down on the reed to secure it.

Attach the beater swing bar to the uprights by sliding it over the top of the beater uprights (see Figure 1, page 5). Make sure the metal pivots are on the underside of the bar, facing toward the back. Set the beater height by inserting metal locking pins into parallel holes of the beater uprights, above the beater swing bar. Lift the beater from the underside of the beater swing bar, on each side, and set the metal pivots into the bronze pivot blocks on top of the frame.

Forward and backward adjustment. The notches of the bronze pivot blocks allow control of the depth of the weaving space. You can set the metal pivots into any of the notches as long as the beater remains parallel to the front breast beam (see below). A maximum shed is attained with the beater closest to the front shaft.

Height adjustment. With the beater hanging freely, the warp line should bisect the center of the reed. To adjust, hold a beater upright in one hand and slide the locking pin out of the hole with the other hand. Move the upright up or down as required and reinsert the pin. Repeat this procedure on the other beater upright, setting it at the same height as the first upright.

Aligning the beater. The beater must be perfectly parallel with the front breast beam. This alignment should be checked periodically, especially if the loom has been moved or is subjected to severe climatic changes. With your hand in the center of the beater top, slowly pull the beater forward. Both ends of the beater should touch the front posts simultaneously. If they do not, realign the beater using the slotted screw holes in the base of the beater pivot blocks. Loosen the screws and tap the blocks lightly with a hammer, either forward or backward, until the beater is aligned. Tighten the screws securely.

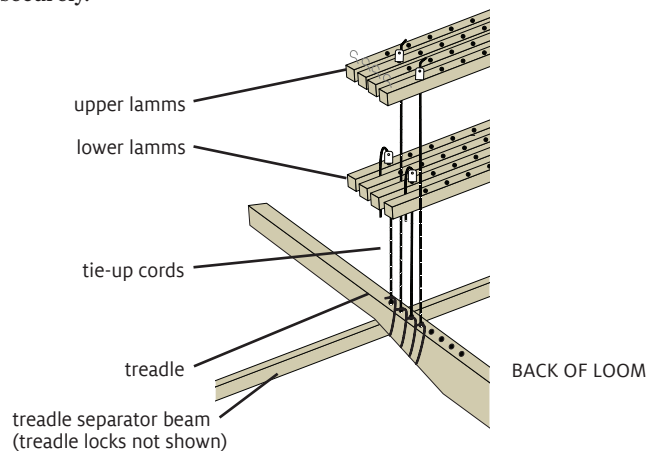


FIGURE 11: TYING UP LAMMS

TYING UP YOUR COUNTERMARCHE LOOM

It is easiest to tie up the treadles before the loom is warped. The tie-up cords should already be attached to the treadles (see page 8).

Before starting the tie-up, make sure that the lock pins are inserted in the overhead jacks—your loom comes with them inserted. Then check to see that the heddle eyes are in a direct horizontal line from the breast beam to the back beam. To do this, simply tie a length of yarn from the warp beam, up over the back beam, over the breast beam, and around the cloth beam. Looking from the side of the loom, check to see that the yarn forms a horizontal line from front to back and passes through the center of the heddle eye. If it does not, adjust the height of the shafts on the shaft hanger cords.

The countermarche loom has a balanced system of rising and sinking shafts. There are two sets of lamms, an upper suspended lamm and a lower lamm. A shaft tied to the lower lamm will rise when the treadle is depressed. Remember: “bottoms up.” A shaft tied to an upper lamm will sink when the treadle is depressed. In tying up the countermarche loom, each shaft is tied to either an upper or lower lamm on every treadle. When you are done, if you are using all 8 shafts, there will be no untied holes left on your treadles. If you have a 4-shaft loom, the back 4 holes on each treadle will remain untied.

Mark your tie-up draft so that you know which shafts should rise and which should sink. Most tie-up drafts are marked for the shafts to rise, so the blank spaces in the draft represent the shafts that sink. You will tie the rising shafts for each treadle to the lower lamm, and the sinking shafts to the upper lamm. Each shaft works independently, meaning that the action of one shaft does not affect that of another.

The specially designed Texsolv tie-up cords supplied with your loom are all the same length, and each one can be tied to either an upper or lower lamm. Each cord has a red loop and a black loop; use the red loop for lower lamms and the black loop for upper ones.

To tie a treadle to the upper lamm, pass the cord in back (or front, when facing the front of the loom) of the lower lamm and up through the upper lamm hole (Figure 11). Wrap the marked loop around the small knob of a plastic anchor peg, then insert the peg's legs into the lamm hole (Figure 12). Hint: When tying up a treadle, rest it on an adjacent treadle lock. It is easier to tie up when there is no weight or tension on the tie-up cords.

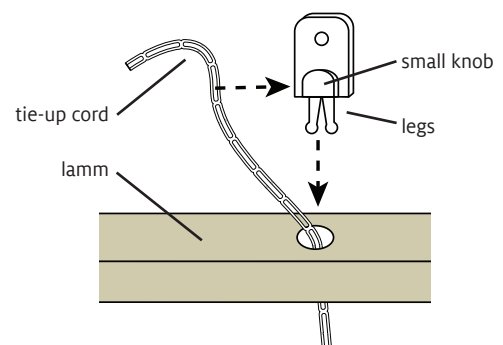


FIGURE 12: ATTACHING AN ANCHOR PEG

To tie a treadle to the lower lamm, pass the treadle cord through the corresponding hole in the lower lamm (Figure 11, page 12). Fasten to the lower lamm through the loop with the red mark, leaving the long tail end of the cord hanging.

Sitting behind the shafts facing the front of the loom, begin the treadle tie-up with the treadle on the left (or the point farthest away from the lower lamm pivot point). In the sample tie-up draft in Figure 13, each X represents a rising shaft and each blank space represents a sinking shaft. It is easiest to tie all the rising shafts first. You will tie these to the lower lamms (remember: “bottoms up”). Tie each treadle cord to the corresponding hole in the lower lamm. Secure the cord with a plastic anchor peg through the loop marked with the red reference mark.

To complete the tie-up for this treadle, tie all the remaining cords (marked with an X in the tie-up draft) to the upper lamms, passing the cords in back of each lower lamm. (Note: the Y-cords are in front of the lamms; the lamm cords are in back of the lamms). Secure the anchor peg in the black reference mark. You will notice that the back cords are tighter than the front cords; this is as it should be.

Tie up the next treadle: Using the same process as for the first treadle, tie up all of the rising shafts, marked with an X in Figure 13. Then tie up all the sinking shafts (blanks in the tie-up). Repeat for the remaining treadles.

Note: For 8-shaft looms, your loom will function best if you tie up at least eight treadles. If you don't need eight treadles for a particular tie-up, tie the treadles you are not using in tabby or twill tie-ups until you have eight treadles tied; if they were tied up for a previous weaving, leave them as they were. Now remove the jack lock pins. The shafts will drop slightly from the weight of the shafts and treadles.

ADJUSTING THE TREADLE SEPARATOR BEAM

The treadle separator beam is used to regulate the size of the sheds and to ease treadling. Adjust the treadle separator beam on a gradual incline, higher on the left. To determine where to adjust the beam, depress the leftmost treadle and look at the shed from the side. It should be open as much as possible but not hit the top or bottom of any shaft. Check each shed by depressing each treadle in turn. Set the treadle support beam for the optimal height side to side.

USING THE BRAKE HOLD

The brake hold is a rectangular piece of wood that hangs from the peg on the right frame side over the brake release pedal (see Figure 2 on page 6). It is used to hold the brake release pedal down while you crank on the warp. The brake hold will come stretch-wrapped into place. To engage the brake hold, slide it out to the end of the peg so it is over the brake release pedal. This will allow the warp beam to turn freely.

INSTALLING AND USING THE DUST TRAY

Parts: dust tray with attached hardware

The meshing of the worm gear on your loom will cause wear over time and slough off metal particles. The dust tray will catch these particles. Clean off the tray periodically to protect your floor and the loom.

After assembling your loom, attach the dust tray to the right front upright below the worm gear. Detach the two 1/4-20 x 3-1/2" Phillips truss head machine screws and two 1/4-20 barrel nuts already attached to the dust tray and clamp.

1. Insert a 1/4-20 x 3-1/2" Phillips truss head machine screw through the clamp (Figure 14).
2. Hold a barrel nut in the hole in the tray.
3. Insert the screw into the barrel nut and fasten loosely.
4. Repeat step 1 with the remaining screw. Position the tray inside the right front upright and the clamp on the outer side, as shown in Figure 14. Hold a barrel nut in the remaining hole in the tray and fasten the screw into it.
5. Position the tray about 3" below the worm gear and tighten both screws.

	A	B
1	X	
2		X
3	X	
4		X

FIGURE 13: SAMPLE TIE-UP

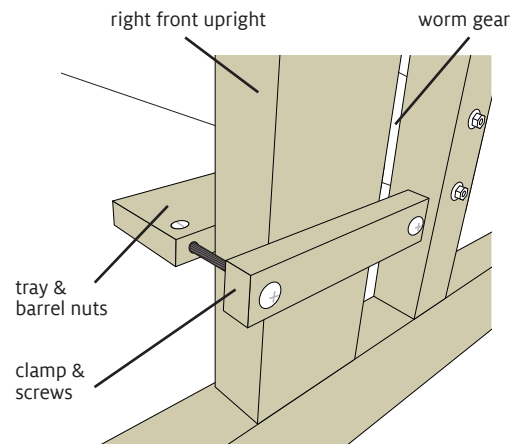
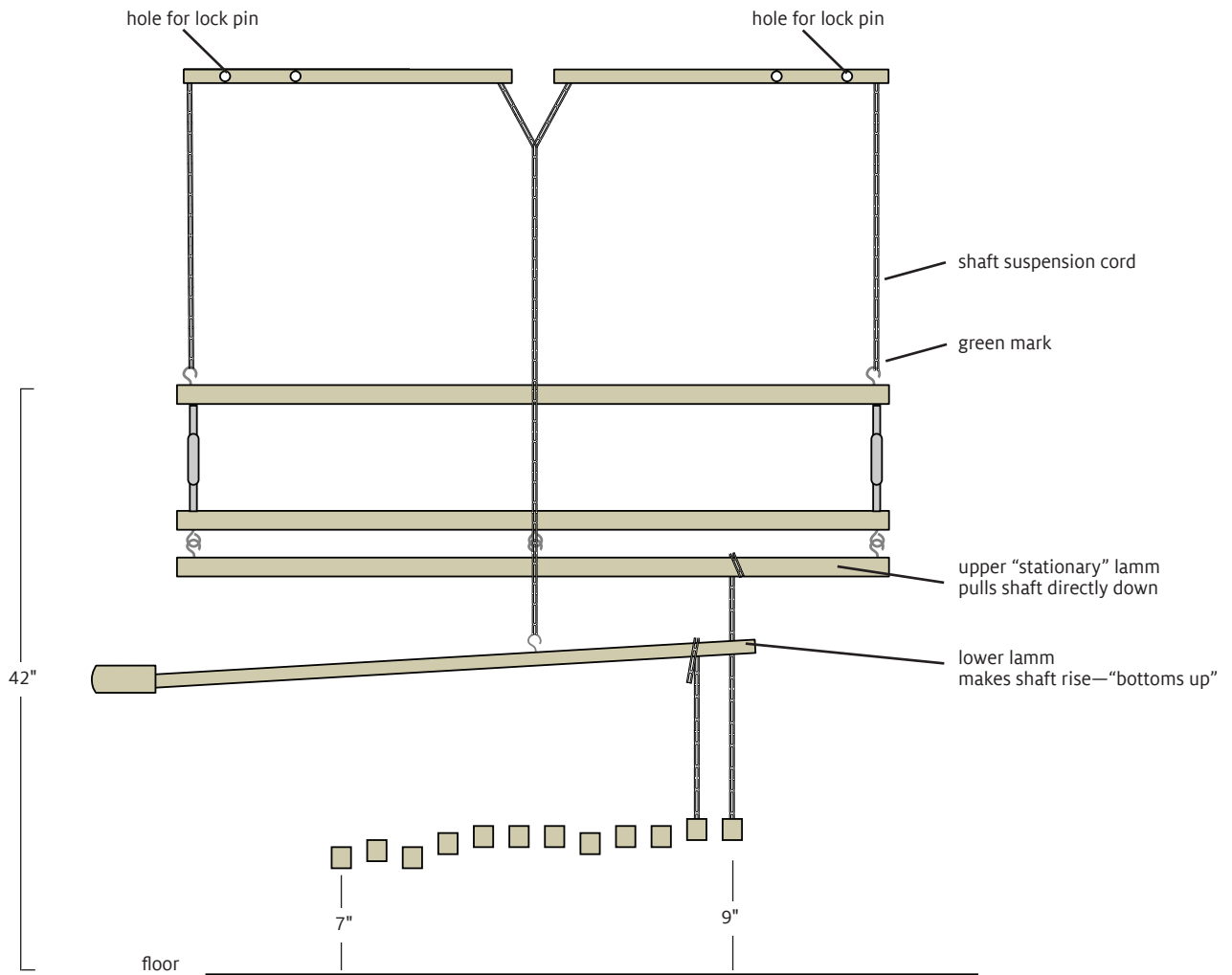


FIGURE 14: INSTALLING THE DUST TRAY

APPENDIX A-1

POSITIONS OF SHAFTS, UPPER LAMMS, LOWER LAMMS, AND TREADLES

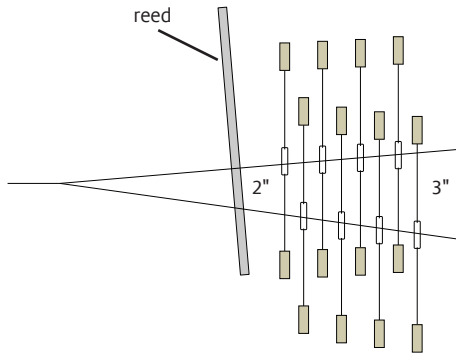
One shaft, viewed from the front



This figure was originally provided by Madelyn van der Hoogt. It has been edited to reflect the current design of the Cranbrook Loom.

APPENDIX A-2

POSITIONS OF SHAFTS, UPPER LAMMS, LOWER LAMMS, AND TREADLES



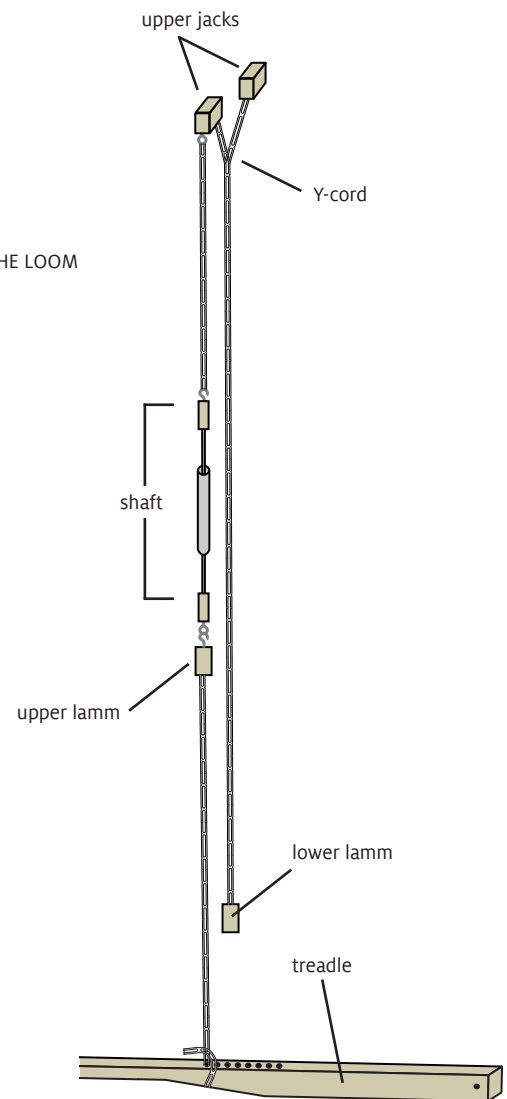
VIEW FROM THE SIDE

To open the same shed height at the fell, the shafts must form a bigger shed the farther away they are from the fell.

The Y-cord (from the upper jacks to the lower lamm) passes in back of the shaft and the upper lamm. The cord from the treadle to the upper lamm passes in front of the lower lamm.

If a treadle hits the lamms, lower the treadle that is hitting by loosening all the cords that are tied to that treadle. Begin with the tie-ups on the back shafts, since these are most often the culprits.

FRONT OF THE LOOM



APPENDIX B

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
Shed won't open.	Jack lock pins haven't been removed. Tie-up cords are crossed. Yoke cords are crossed.	Remove jack lock pins. Check to make sure treadle-lamm cords are tied in appropriate holes. Check to make sure the yoke cords are connected to the corresponding lamm.
Loom treadles hard.	Treadles are hitting lower lamms.	Adjust shafts or treadles.
Shafts tilt.	Warp not in center. Narrow warp	Center warp. Tie warps at edges of apron rods.
Lower shed is uneven.	Upper lamms not all tied in the black mark.	Check tie-up cords to upper lamms. Lift up on shafts to determine which shaft is in error and adjust the tie-up cord accordingly.
Upper shed is uneven.	Lower lamms are not all tied in red mark.	Check tie-up cords to lower lamms. Lift up on shafts to determine which shaft is in error and adjust the tie-up cord accordingly.
Shed is too small.	Treadles are hitting lower lamm. The heddle eyes are not in the center of the shed. Warp does not go over back beam.	Adjust the shafts. Raise or lower the shafts so that the warp passes through the center of the heddle eye. Take out beam and place under warp and reinsert beam.

APPENDIX C

ADJUSTING THE SHED

PROCEED CAREFULLY, ADJUSTING YOUR CORDS ONE NOTCH AT A TIME AND TESTING.

ADJUSTING THE SHED BY ADJUSTING THE TIE-UP CORDS

- If the upper shed (raised warps) is uneven:

Raise the threads by shortening the lower lamm cord of the errant shaft, by inserting the anchor peg one notch below the red mark.

- If the lower shed (sinking warps) needs to be adjusted:

Determine which shafts are errant and whether they need to be raised or lowered (that is, if shaft 2 is the only shaft that is hanging above or below the other sinking warps, fix this one only). To adjust, either shorten or lengthen the tie-up cord to the suspended (upper) lamm. To shorten the cord attach the anchor peg one notch below the black mark; to lengthen, attach one notch above the black mark.

- Lower lamm = rising shed = red mark on the cord (usually O in the tie-up)
Remember: bottoms up!

- Upper lamm = sinking shed = black mark on the cord (the X in the tie-up)

ADJUSTING AN ENTIRE SHAFT

This adjustment will affect all the tie-ups for that shaft.

You can raise or lower an entire shaft by shortening or lengthening the upper lamm cords. Move one notch above or below the green marks. Be sure to keep the shaft level.

FOR A LARGER SHED ON ALL SHAFTS

You can shorten the lower lamm cord. To shorten the lower lamm cord, insert the anchor peg one notch above the blue mark.



CounterMarch (general) and Cranbrook (specific)

Loom length

The longer the loom, the less the relative difference in tension between raised/lowered warp threads and warp threads at rest. Therefore, if the warp is held at maximum tension (as is desirable, especially for rugs), the longer the distance from front to back beam, the less resistance the warp makes to forming the shed (and therefore the easier the treading).

Rolling threading/tie-up bench

This is useful for threading (if threading from front to back) or for tying up the treadles before the loom is threaded (it is a little hard to sit on it to tie up the treadles if the warp is in place since it is so high that you must bend your head under the warp). The tie-up can be made before the loom is warped, however, since the texsolv notches to use for the tie-up can be standardized. Only a few tie-up adjustments should be required after the loom is warped.

Extended pivoting position for lamms

This extension causes the lower lamms to pivot through a slightly shallower angle than if attached at the loom side, helping to prevent interference between sinking lower lamms and rising treadles or between rising lower lamms and sinking upper lamms. They are not even close to interfering (1" is the closest any of them come to each other on this loom).

Increased height of loom

This is an important improvement that allows sufficient space for pivoting lower lamms without their interference with rising treadles or sinking upper lamms. (Also important in this loom design is the non-pivoting upper lamm which requires less space for movement than would a pivoting upper lamm.)

Adding treadles

More than 10 treadles can be used (2 more without any difficulty, and perhaps even 4). If treadles are tied too close to the pivot point of the lower lamm, it is more difficult to move the lamm. If treadles are tied too far away from the pivot point, rising treadles are more likely to interfere with sinking lower lamms. There also may be a limitation as to how close to the ends of the upper lamm a treadle can be tied without causing the shaft to tilt during treading. (Tilting may also occur if the warp is much narrower than the width of the treadles. Dummy warp ends can be added to the outer edges of the shafts to prevent tilting.)

Cords marked for standardized tie-up

Since they are further from the fell, shafts at the back must move more than shafts at the front to produce the same shed angle at the fell. The treadle shape provides that the cords looped around the treadles are 2" shorter for the last shaft than for the first (and graduated from back to front) so that as the treadle moves, it acts on the back shafts first and moves them more. The notches to use for ties to upper and lower lamms can therefore be the same for each tie-up cord and can be marked to standardize the tie-up (maximum shed size is 2-1/2").

Cord positions

Each cord that goes from a treadle to an upper lamm should pass in front of the corresponding lower lamm for its shaft. (Each Y cord should pass from the lower lamm to the upper jacks behind the upper lamm and its corresponding shaft.) Cords to upper lamms should not pass through the holes in the lower lamms.

Tying up your Cranbrook

These directions assume that the notches are pre-marked for hanging the shafts to the upper jacks, for attaching the Y cords to the upper jacks and lower lamms, and for tying the treadles to the upper lamms (black) or lower lamms (red). All heddles must be the same standard size. All ties are completed with the locking pins in place.

1. Hang the shafts from the upper jacks. (Hang all shafts and lamms whether or not they will be used. Immobilize unused shafts by keeping the locking pins in their corresponding upper jacks during weaving.)
2. Attach the upper lamms to the lower shaft bars.

3. Attach the Y cords to the upper jacks. Suspend the Y cords from the upper jacks so that each cord passes behind its corresponding shaft.
4. Place lower lamms on lamm pivot rod.
5. Attach Y cord to each lower lamm (pass cord through hole in lamm and attach with clip below lamm).
6. Suspend the treadles from treadle pivot rod. (It is a good idea to position all the treadles whether you are using them all or not.)
7. Loop tie-up cords around all treadles for all shafts (marked black notches should be at end of cord farthest from the loop.)
8. Tie treadles to lamms according to tie-up. Every cord on every treadle is attached to either a lower lamm (to make the shaft go up—BOTTOMS UP!) or an upper lamm (to make the shaft go down). A cord tied to an upper lamm must pass in front of the corresponding lower lamm for its shaft (not through a hole in the lower lamm). To tie, pass the cord up through the appropriate lamm hole, push the tab on the texsolv clip through the marked notch (black for upper lamms, red for lower), and stick the two legs of the clip down into the hole in the lamm.
9. Remove the locking pins. It is important that the down shed be even so that the shuttle can travel smoothly from selvedge to selvedge. It doesn't really matter if the upper shed is uneven; it must only be big and clean enough for the shuttle to travel through. Adjustments can be made if the shed is not even enough.
10. Step on each treadle to check each shed. If any shaft does not go down (or up) enough, tighten the tie for that shaft on that treadle (i.e., make the cord shorter by moving the clip one notch closer to the treadle). If any shaft moves up or down too much more than the others, loosen the tie for that shaft (move the clip one notch away from the treadle). Remember that any clip you move will only affect that shaft on that treadle; you can't wreck anything by moving a clip.
11. The loom will function best if you tie up at least eight treadles. If you don't need that many for a particular tie-up, tie the treadles you are not using (up to eight) as though they are weaving an even/odd tabby (alternately evens/odds up/down) (or, if they were tied-up for some previous weaving, leave them as they were).
12. Sometimes the front shafts sag when the loom is at rest—their heddles will appear loose. This can be counteracted by tying one treadle (usually the one farthest from the pivot point) to the lower lamms for that shaft(s) and weighting it if necessary. This sagging is not a problem except with very fine warps—the sagging heddles can catch on adjacent threads, pulling them counter to the movement of their own shafts during treadling, causing them to break.

Miscellaneous

1. Note that the upper lamm tilts slightly upward as it moves away from the pivot point. The treadles will therefore rise slightly higher as they are further away from the pivot point.
2. It is important that the warp be centered in the loom. There should be as many warp ends to the right of the Y cord as to the left.
3. If heddles don't slide easily on the shaft bars, tie a cord around the shafts at each side so that the shaft bars move slightly closer together, loosening the heddles on the shafts (this may not be necessary on the Cranbrook; I couldn't tell how easy it is to slide the heddles).
4. For very fine warps, the texsolv Y cords can be too rough. They can be replaced with a smooth dacron fish line or other material (or covered with a plastic tube) or some other method devised to insure that they do not rub or catch on the warp.
5. Beater height: the warp should be in the middle of the reed at rest.
6. Beater position (forward or back): I don't personally find it necessary to have many positions for the beater. The best spot allows maximum shed formation without too much pushing back of the beater. It is best to advance the warp often and beat in approximately the same place throughout weaving.