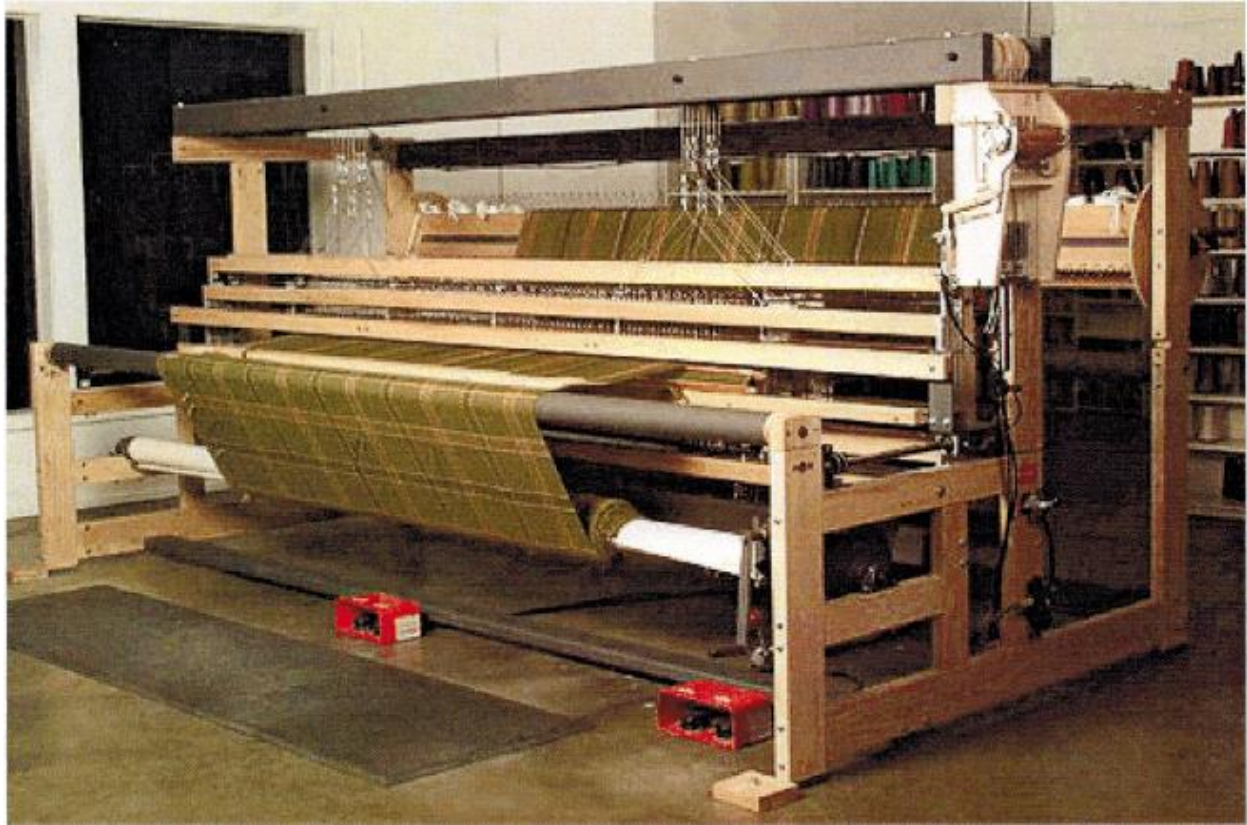


# Rug Loom User's Manual



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# **INTRODUCTORY INFORMATION**

## SAFETY

**Before Getting Started:** Please read the entire manual before using the loom.

### Warnings:

**WARNING: EQUIPMENT SHOULD ONLY BE USED FOR TEXTILE MANUFACTURING. IF THE EQUIPMENT IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED.**



**WARNING: ELECTRICAL SHOCK HAZARD. DO NOT TAMPER WITH ELECTRICAL WIRES OR OPERATE THE LOOM WITH SAFETY PANELS OPENED OR REMOVED.**



**WARNING: PINCH, CRUSH, AND FINGER CUT-OFF HAZARDS. DO NOT OPERATE THE LOOM WITH SAFETY PANELS OPENED OR REMOVED. DO NOT PLACE HANDS IN MOVING MECHANISMS OR SCISSORS.**



**WARNING: EQUIPMENT PANELS ARE AWKWARD AND HEAVY. TO AVOID MUSCLE STRAIN OR INJURY, USE PROPER LIFTING TECHNIQUES AND A HELPER.**

**WARNING: DO NOT POSITION EQUIPMENT IN A WAY TO BLOCK OR IMPEDE ACCESS TO DISCONNECTING DEVICES, EMERGENCY STOPS, OR ON/OFF BREAKER SWITCHES**

**WARNING: USE OF CONDUCTIVE FIBER OR YARN ON OR AROUND THIS EQUIPMENT WILL VOID WARRANTY AND MAY DAMAGE EQUIPMENT.**

**WARNING: THIS EQUIPMENT IS CLASSIFIED FOR LIGHT INDUSTRIAL ENVIRONMENT ONLY. OPERATION OF HIGH-CURRENT DRAW EQUIPMENT (EX. MIG WELDER) ON THE SAME ELECTRICAL CIRCUITS MAY CAUSE EQUIPMENT FAILURE.**

### **Safety Features:**

Covers and shielding separate weaver from moving components where pinch hazards exist. Do not reach under a covers and shielding while the loom is operating.

## INTRODUCTION

### About AVL

AVL Looms has been in the business of designing and building some of the world's finest handweaving looms since 1977.

Jim Ahrens had been building and designing looms for a number of years before Jon Violette, the "V" in AVL, approached Ahrens about a partnership in 1977. Violette, an industrial management professional, had discovered Ahrens' work through his sister who ran the Pacific Basin School of Textiles in Berkeley, where Ahrens was a volunteer advisor.

The two men worked together in the Bay Area for three years until Violette moved Ahrens and Violette Looms to Chico, where it officially became known as AVL Looms Inc., and has operated ever since.

### The Rug Loom Design Concept

The Rug Loom is designed for professional rug weavers. Starting at four feet and available up to 20 feet, this loom offers enough width for any of your needs.

The four foot and six foot rug loom are made of wood. The eight foot rug loom has wood side frames with steel cross members for strength. Looms wider than eight feet are made mostly of steel.

The AVL rug loom has several components which are air driven and require an air compressor to be hooked up to the loom. As with all AVL looms, the rug loom can be customized to fit your needs.



## **LOOM FEATURES**

### **Brake and Tension System**

The warp tension is maintained with an air-controlled locking brake. The tension and the brake are controlled with levers at the front of the loom.

### **Cloth Storage System**

The Cloth Storage System stores the finished cloth conveniently out of the way on a beam under and behind the cloth beam.

### **Sliding Beater**

The Sliding Beater is a standard feature of the Rug Loom. This beater allows you to beat in weft tightly and easily. The normal sliding beater can be replaced with an air beater.

### **Sectional Beam**

If you have purchased a Sectional Beam, you will find it to be extremely adaptable to your needs. Because each of its hoops is removable, you may create sections of any width you like, provided they are calculated in one-inch increments.

An AVL Sectional Beam with metal hoops has holes for the hoops at 1" sections. The wheel comes with enough metal hoops to setup 2" sections. More hoops can be ordered from AVL if narrower sections are desired. For wider sections, remove as many metal hoops as needed.

### **Plain Beam**

The Plain Beam is provided with an apron, which will allow you to maximize the length of your warp.

### **Dobby**

The Rug Loom can come with either a mechanical dobbie with an air lift or an air Compu-Dobby.

### **Air Lift**

The Air lift or Air Compu-Dobby replaces treadles on your loom and allows the shafts to be lifted easily and smoothly by pressing a pedal.

## Spring levers

There is a spring lever for each harness which stabilize the harnesses and encourage their vertical fall when the shed is released.

## Harnesses

You will have metal heddles on your loom. Metal heddles, whether twisted wire or flat steel, are suspended from steel heddle bars mounted in rigid frames. In all cases, the harnesses are stabilized at the bottom by a set of spring levers. These hold the harnesses down and prevent your heddles from floating.

## Automatic Cloth Advance (Optional)

The rug loom can be customized with an automatic cloth advance. The locking brake on the warp beam will be replaced with an automatic warp let off system. The cloth storage beam will also be automatic. These three systems will work together.

# AIR COMPONENT INFORMATION

## Compressor

A machine which compresses, stores, and delivers air to an air system.

## Air Cylinder

A sealed tube that contains a movable shaft. This shaft is caused to move in or out by the action of compressed air.

## Exhaust Valve

Some of the systems on your rug loom are powered by compressed air. This air comes into the system via the compressor, is forced through the cylinder, and is then vented from the system. An exhaust valve is the door through which the air leaves.

## FRL

This is a filter and regulator together in a single device. The air that comes from your compressor feeds directly into the FRL where it's conditioned and its pressure regulated.

## Piloted Valve

This valve directs the flow of air to and from different parts of the system.

## Rod End

The working end of an air cylinder which connects to the mechanism that needs to be moved.

## Air Compressor Requirements

Compressors are rated according to the volume of compressed air they can delivery in one minute. This rating is known as C.F.M., cubic feet per minute.

<b>DEVICE</b>	<b>USAGE</b>	<b>UNITS</b>	<b>PER</b>	<b>COMPRESSOR RATING *</b>	<b>UNITS</b>	<b>NOTES</b>
RL 48 in., 72 in., 96 in., 120 in.	0.73	CFM @ 100 PSI	Loom	2	CFM	Rated @ 30 PPM
RL 144 in., 180 in.	1.45	CFM @ 100 PSI	Loom	4	CFM	Rated @ 30 PPM
Air- Assisted Shuttle Boxes	0.47	CFM @ 100 PSI	Loom	2	CFM	Rated @ 60 PPM

PPM = Picks Per Minute

CFM = Cubic Feet Per Minute

PSI = Pounds Per Square Inch

We suggest sizing a compressor for worst case scenarios like 50% duty cycle. When using a 50% duty cycle, doubling the usage rate is the first step, then adding another 50% will insure the compressor is not working at maximum capacity, making it last longer and delivering reliable compressed air to AVL products.

### Note:

**If you will be using multiple air components, make sure your air compressor is sized to handle all of them.**

Exceptions to the above sizing methods are products that may use compressors other than the reciprocating type. Screw type compressors are

often used in higher volume applications such as IDL's, or a Jacquard with several heads.

The choice of a compressor is yours. In general, we advise you to buy a compressor that can deliver more air than you actually need -- it will run more efficiently, last longer, and allow the addition of future air components.

Nearly all compressors have storage tanks. Here, too, size is important. We recommend that you consider a compressor with at least a twenty gallon tank.

## SET UP

Even the narrower rug looms will require the efforts of two people for many of the assembly operations. Several of the components can be quite heavy, especially in longer lengths. ***PLEASE TAKE PRECAUTIONS TO PROTECT YOUR BACK, YOUR FINGERS, AND FEET WHEN HANDLING THESE PARTS!***

If your loom was assembled by AVL, it will have arrived on a pallet, possibly within a protective framework. Accessories too large to include with the loom will be located in supplementary boxes.

Looms delivered knocked-down will arrive in several boxes of various sizes.

Please confirm that you received the number of boxes indicated on your copy of the Bill of Lading. If any are missing, please call the delivery company.

### Shipping Damage or Missing Boxes

Looms are rarely damaged in shipping. AVL takes special effort in providing suitable packaging, however, on occasion a box will get damaged or go missing. To protect against this, AVL ships every loom insured. We will assist you in the event that there is a problem. We just require you follow these simple steps:

- 1) At receipt of the shipment while the driver is unloading, please confirm receipt of the correct number of boxes as indicated on your copy of the Bill of Lading, and that there is no external damage to the boxes/crate. If any boxes are missing or damaged, please require the driver to make notes on his paperwork. Failure

to have the driver note the problem significantly shortens the timeframe for a claim to as little as 5 working days.

- 2) Upon departure of the truck, take pictures of the damaged box and email the pictures to AVL. We will use the pictures to initiate a claim.
- 3) As soon as possible and preferably within a few days, open each damaged box/crate to search for damaged or missing items. We can provide you with a list of what was in the box. Please take pictures of what you see, especially of damage to parts. This information will help us identify what to replace and how much to claim against the insurance.
- 4) Lastly, save your packaging materials and parts in case the freight/insurance company wishes to inspect the damage.

Assuming you have followed above procedure, AVL will replace the damaged parts as quickly as possible. An invoice will be issued with expectation for payment via the claim reimbursement. Should the reimbursement be paid directly to you, the invoice will become immediately due and payable by you.





# LOOM ASSEMBLY

## BEFORE YOU BEGIN

Putting together your new loom may look intimidating at first, but this manual is designed to guide you through the process with clear steps, pictures, and diagrams. If the manual is unclear or confusing at any point, call us at 530-893-4915. We're here to help.

There is a definite advantage in assembling your own loom. You'll come to know it very well, sooner than you otherwise would, and the better you know your loom, the better you'll be able to use and maintain it.

### Tools

You'll need a few basic hand tools to assemble your loom. We recommend a couple of others that we think will make your job easier.

- Ratchet and sockets: 7/16", 1/2", and 9/16"
- Standard screwdriver
- Medium Phillips screwdriver
- Hammer or mallet
- 8" or 10" adjustable end wrench
- Carpenter's level
- Framing square
- Pliers
- Three wooden blocks or books (approximately 2" thick)
- Step stool
- Power screwdriver with assorted bits (optional)
- Extra ratchet and sockets (optional)

You'll need an area roughly 10' x 10' in which to assemble the side frames. If the floor is concrete, you may want to lay a tarp down to protect the lacquer finish on the parts.

Once you've gathered your tools, place the boxes near the location where you will be assembling the loom. **Please DO NOT REMOVE the tape from any of the components until we tell you.** Also leave the hardware bags unopened until they are required.

Keep as many of your packing materials as you can in case you need to ship or store your loom in the future. Clear away your packing materials from your working space. It's best if you keep your work area as organized and free of clutter as possible.



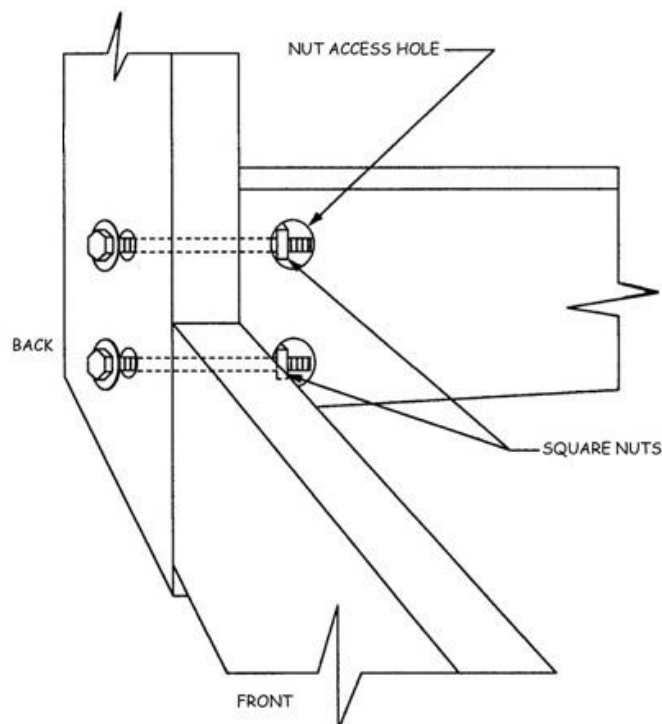
## Inserting Nuts And Bolts

### NOTE:

Given the limited space provided by the nut access holes, it can be challenging at first getting the nuts onto the bolt ends. You'll find it helpful to push each bolt in just until it just appears in the access hole. Move the nut into position over the end of the bolt and hold it with your finger. Slowly turn the bolt clockwise and when the nut engages, tighten it most of the way down.

If your fingers are too big to comfortably manipulate the nut, try holding it with a flat blade screwdriver or needle-nose pliers. Always have the large "nut access hole" facing toward the inside of the loom unless otherwise specified. Square nuts always go in "nut access holes" and do not take a washer.

Looms 8 feet or wider have steel beams as part of the structure. For these looms, the bolts are screwed into a pre-threaded hole on steel beams. There may also be wooden parts with nut access holes depending on the loom.



**Figure 1 - Inserting Nuts**

### Note:

As you are building the loom, do not tighten the nuts all the way down. You will tighten everything down once you have squared and leveled the loom as described on page 20.

## Hardware

If a bolt is a little tight going into a hole, give it a light, friendly tap with a hammer.

Always put a washer under the head of a hex bolt. Any nut that is NOT in an access hole also requires a washer. This will prevent damage to the wood.

If you have trouble turning a screw into the wood on your loom, try dressing the threads with a little bar soap.

The rug loom consists of large, heavy parts and assemblies that may require more than one person to hold in place during assembly. It can be helpful to place bolts into partway place on the frame before placing cross members into place. It will then be possible to insert the bolts the rest of the way quickly into each hole. This will reduce the amount of time that the cross member needs to be held in place.

## SIDE FRAME ASSEMBLY

Your first task will be to construct the left and right side frames, to which you will add the various other loom parts. As you work through the assembly sequence, you will add components in the order given in the assembly instructions.

You will need a 9/16" ratchet to assemble the side frames.

- 1) Locate boxes containing the side frames and remove the contents. Note that each component is identified by number. These numbers correspond to the Side Frame Assembly diagram.
- 2) Check the contents of the hardware bag against its packing list and group similar bolts together. Each bolt should have been fitted at AVL with a lock washer, a flat washer, and square nut, in that order.
- 3) Separate the parts into the right and left frames. Assemble one frame at a time.
- 4) Arrange the parts in your work area according to the diagrams. Orient the pieces so that the large access holes face up.

### Note:

**It is usually easiest to begin with the longest part (1) and arrange the rest of the side frame around it.**

- 5) Use the appropriate bolts, according to the diagram, to loosely connect each part to its neighbors.
- 6) Once the frames are loosely connected, tighten all of the bolts.

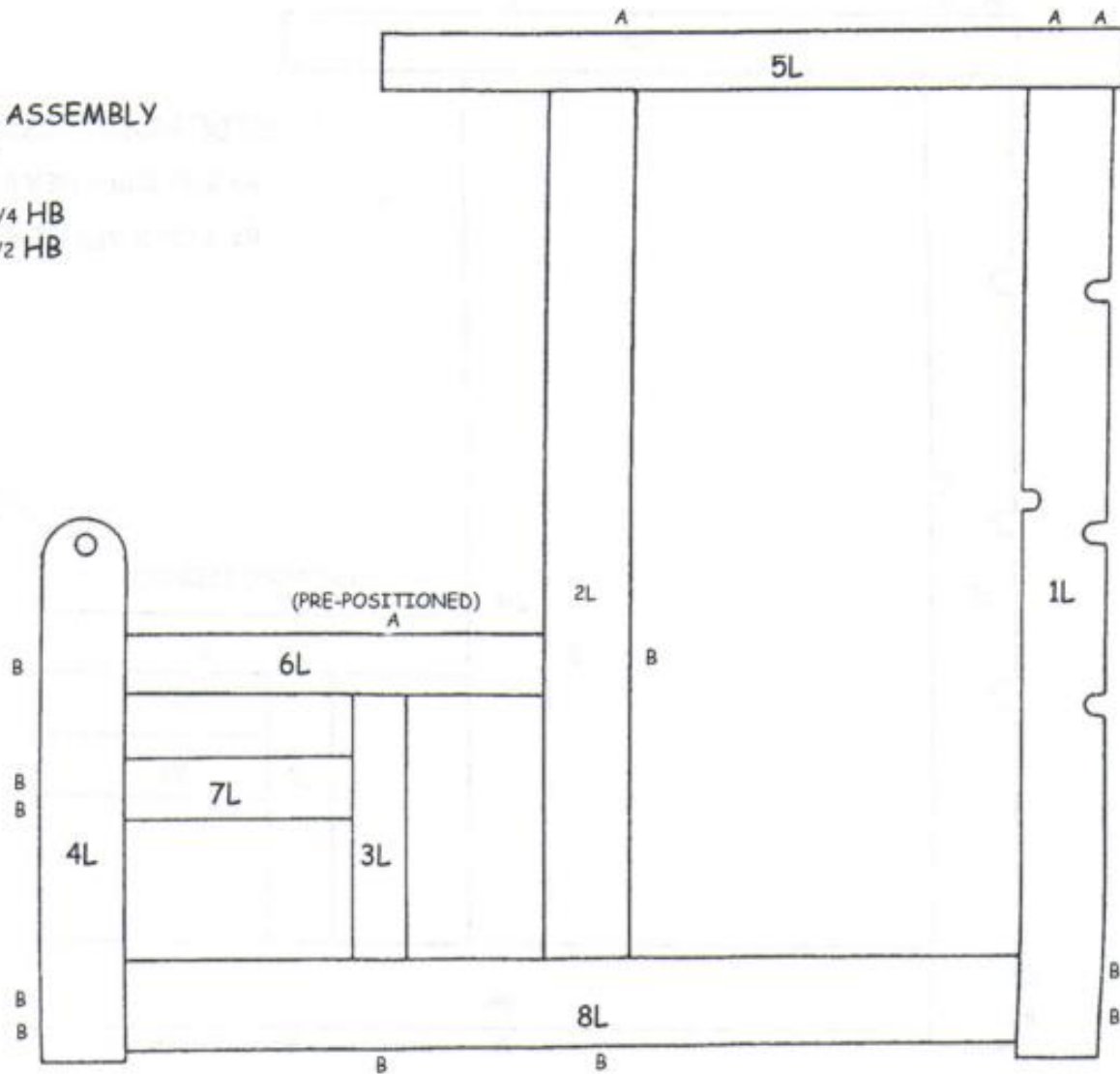
**Note:**

**If you have a wooden frame, make sure you do not tighten the bolts too much and crack the wood.**

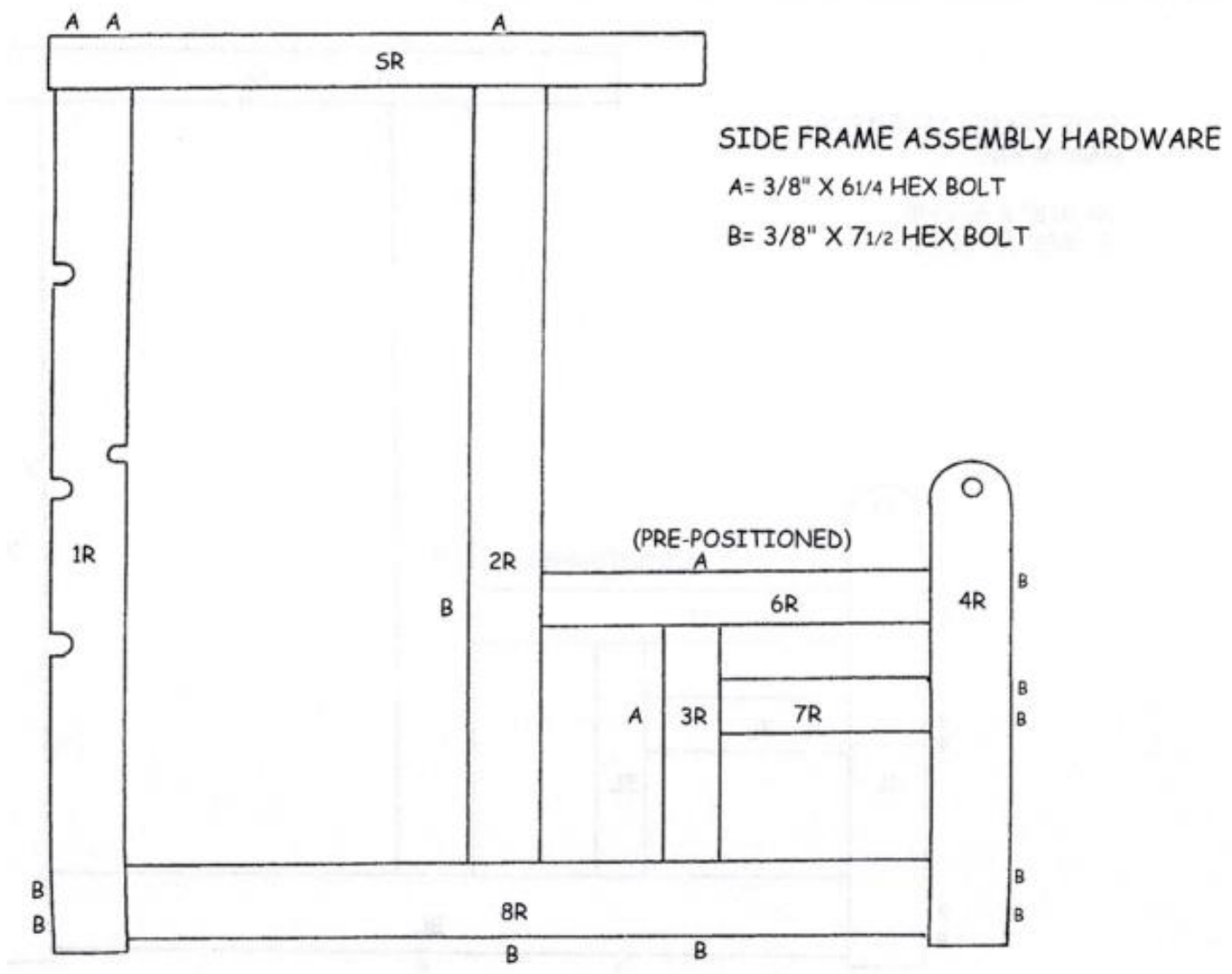
**SIDE FRAME ASSEMBLY  
HARDWARE :**

A= 3/8" X 6 1/4 HB

B= 3/8" X 7 1/2 HB



**Figure 2 - Left side frame completed**



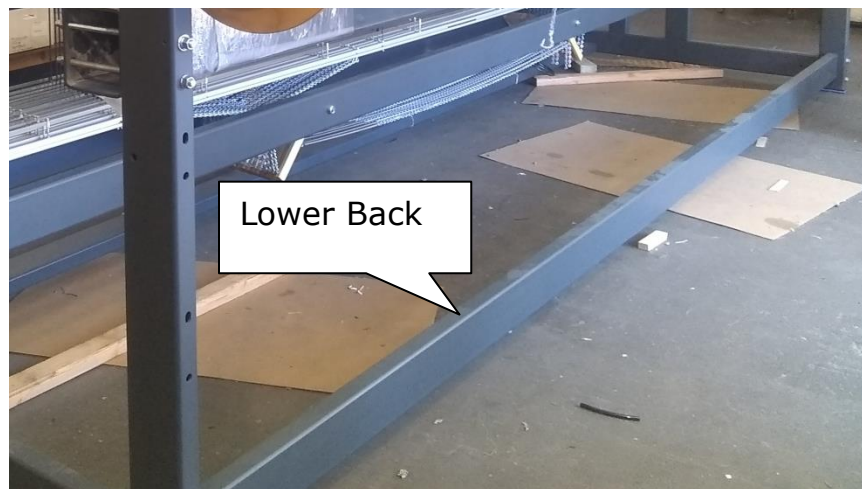
**Figure 3 - Right side frame completed**

## ADD CROSS MEMBERS

In the next phase of assembly, you'll hang various cross members between the side frames. As you progress, the loom frame will become sturdier and free-standing. Be sure to move the frame to its final position before it becomes too heavy. A 12' Rug Loom can weigh as much as 2300 lbs (1045 kgs). Moving the steel beams into place is heavy work, especially for the wider looms, and we recommend that you have plenty of help at hand at that point.

### Lower Back

- 1) Find the box containing the cross members and remove and organize its contents. Note that the cross members have part names instead of numbers.
- 2) Locate the cross member hardware pack. Sort and verify its contents.
- 3) Move the left side frame into position and lay it on the floor with the access holes facing up. The short, round-topped, vertical member is at the front of the loom.
- 4) Bring the Lower Back to the loom and place it on the floor with the access holes facing what will be the front of the loom.



**Figure 4 - Lower back on loom**

- 5) Use two 3/8" x 4" hex bolt assemblies (bolt/lock washer/flat washer/ square nut) to secure the left end of the Lower Back to

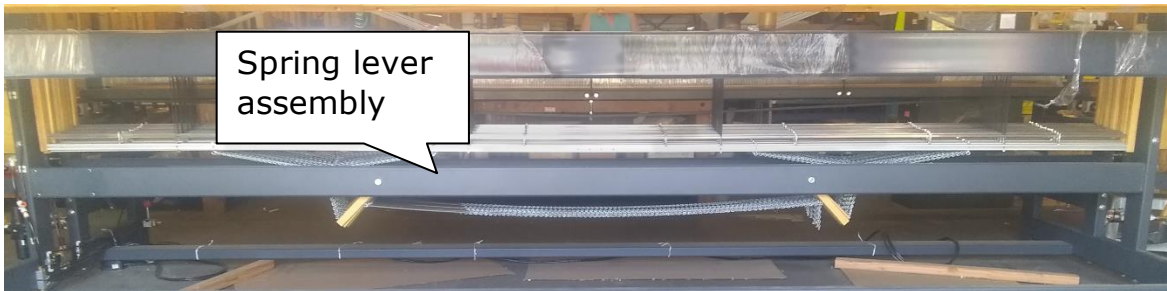
the rear of the left side frame. Snug the bolts down, but do not tighten.

- 6) Repeat for the right side frame. The frame will now stand unsupported.

## Spring Lever Assembly

You will need at least one person holding the spring lever assembly in place while another person adds the bolts to lock it into place. Depending on the size of your loom, more than one person may be needed to hold the spring lever assembly in place.

- 1) Locate the box containing the Spring Lever Assembly.
- 2) Find the hardware packet. You will need four 4" hex bolt assemblies to mount the spring lever assembly in place.
- 3) Locate the appropriate mounting holes in the side frames.
- 4) Bring the Spring Lever Assembly into position. Use the bolts to attach the assembly to the loom.



**Figure 5 - Spring Lever Assembly**

### Note:

It is correctly oriented if the chains hanging from the levers face the side frames and are to the inside of the loom. There should be a label affixed to the assembly that indicates the *Top/Front*.

- 5) Add the nuts and snug the bolts, but do not tighten completely.

## Harness Pulley Support Assembly

- 1) Find the Harness Pulley Support Assembly. It is easily identified by the three sets of pulleys.

- 2) Bring it to the loom and orient it so that the metal identification plate faces front. One set of pulleys will be offset to the far right side of the loom.
- 3) Raise the assembly into place and orient it over the appropriate mounting holes in the Top Horizontals. The ID plate should face forward.

**Note:**

**Be very careful of your back; get extra help if you feel you need it.**



**Figure 6 - Harness Pulley Support Assembly**

- 4) Select two 8" hex bolt assemblies and two stud assemblies (10-1/4" or 12-1/4" depending on your loom) from your hardware assortment. The studs will have a nylock nut cemented at one end.
- 5) Bolt it into place. The long studs insert at the rear holes, the 8" hex bolts in the front.

## SQUARE THE FRAME

In order for the loom to function well, it must be reasonably square and level. We'll check for squareness first. You may do this with either a carpenter's square or a 25' tape measure.

### Using a Carpenter's Square:

- 1) Check the loom frame at the lower rear comers. Bear against opposing comers to adjust the frame until it comes into square.
- 2) Now, go back and firmly tighten all the cross member bolts that you previously left only snug.

### Using a Tape Measure:

- 1) You will use the tape to check the loom's diagonal measurements. First measure from the inside bottom of the Left Front Vertical, to



- the outside front of the right Rear Vertical. Record your measurement.
- 2) Do the same from the Right Front Vertical to the Left Front Vertical. Record and compare the two measurements. When they are equal, the frame will be square.
  - 3) From opposing comers, bear against the frame as needed to bring the frame to square.
  - 4) When you have put the frame square (within 1/8"), go back and tighten all the connecting bolts.

## ADD REMAINING CROSS MEMBERS

### Lower Front

If you have a loom with a wooden frame, you will need three wooden blocks to temporarily raise the front of the loom. You can also use thick books. You need to raise the front of the loom approximately 2". The access holes for the nuts on the lower front need to be placed towards the floor. Place blocks under each Front Vertical, left and right. This will raise the front of the loom enough for you to install nuts on the bolt ends where they emerge in the blind access holes. Place an additional block under the right end of the Lower Front.

If you have a steel frame loom (looms wider than eight feet), the bolts screw into threaded holes in the cross member. You will not need to raise the front of the loom in order to access these holes.

- 1) Bring the Lower Front into position between the free-standing side frames.

#### Note:

**For a wooden frame, position the bolt holes towards the floor. Use blocks as described above to raise the loom up so that the holes can be accessed.**

- 2) Select four more 3/8" x 4" bolt assemblies and pre-position the bolts in the attachment holes, from the outside of each side frame.
- 3) Lift the left end of the Lower Front until its bolt holes are opposite those in the side frame. Push the bolts into position and add the square nuts. Snug, but don't tighten.



**Figure 7 - Lower Front on loom**

- 4) Repeat at the right end.
- 5) Remove the blocks. You won't need them again.

### Upper Back

- 1) Hold the upper back in place on the loom.



**Figure 8 - Upper back on loom**

- 2) Add the bolts.
- 3) Add square nuts and tighten.

## LEVEL THE FRAME

Failure to level the loom now may affect the beater operation level. However, the frame needs to be only reasonably level, not precisely level.

- 1) Use a carpenter's level to check the frame across the center of the Front Harness Pulley Support.
- 2) If the bubble is more than slightly beyond the plumb lines, you may need to shim one or more of the verticals.

## DOBBY ASSEMBLY

The Dobby Head is shipped in its own box. Please locate it now. The dobbie head is the same whether you have a mechanical dobbie with air lift or an air compu-dobbie. Depending on which type of dobbie you have, some hardware may already be installed on the dobbie head.

- 1) Unpack the head and set aside the other items in the box. Bring the head to the right side of the loom. The cable array is at the top of the unit.
- 2) The three attachment bolts are already in place in the head. Remove the hex nuts and washers.
- 3) Identify the mounting holes in the Right Side Frame, align the bolts, and push the head into place.



**Figure 9 - Dobby Head**

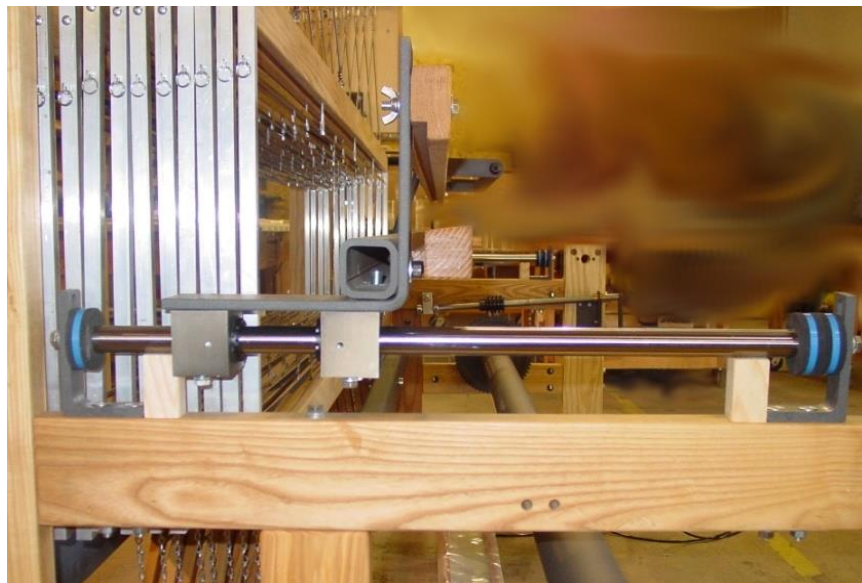
- 4) Add the nuts/washers and firmly tighten the head to the frame.

## **BEATER ASSEMBLY**

The Beater Assembly is quite heavy and you will need help to install it. Note that the mounting brackets are already in place on the side frames.

- 1) Bring the Beater Assembly to the front of the loom.
- 2) Open the hardware bag and remove the four short hex bolts with washers. Locate as well the four wooden blocks we provided. Place two bolts and two blocks on the floor to the outside of each side frame.
- 3) Next, lift the Beater Assembly into position and bolt it into the mounting brackets, using the four hex bolts. Leave the end bolts loose for the moment: you still need to adjust the height of the beater.

- 4) At each side of the loom, insert two blocks under the slide rods, near the front and rear brackets. These blocks are pre-cut to a particular dimension and will establish the correct height of the beater. Let the Beater Assembly rest on the blocks.



- 5) Tighten down the four end bolts that connect the slide rods to the support brackets. Remove the blocks.
- 6) Move the rubber washers fore and aft, up to the brackets. You should have two washers to the front of the beater and one aft.



- 7) Check the travel of the beater. It should move smoothly front-to-back, without binding, and should offer very little resistance. If

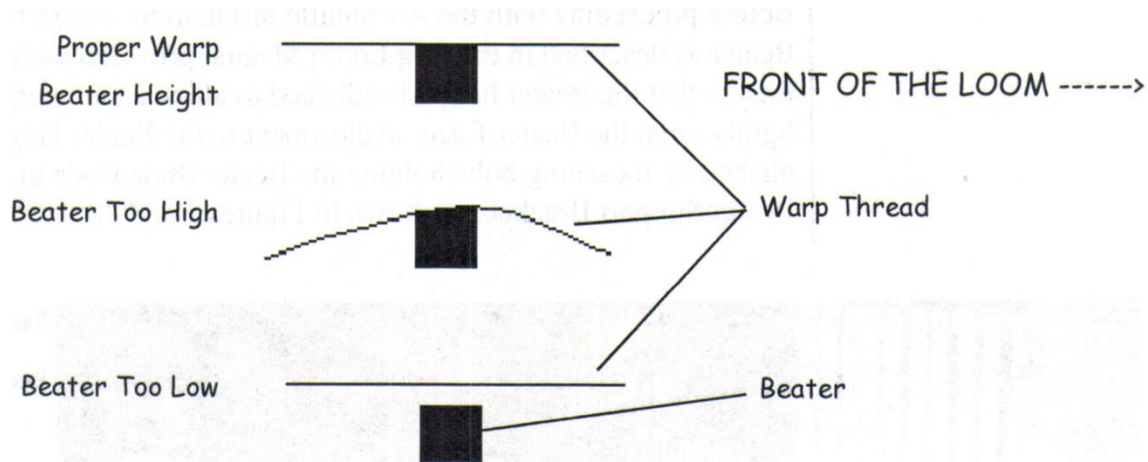


you find that you need to overcome resistance, another adjustment is in order.

## Adjust the Beater Height

In adjusting the Beater height, you will be setting the three warp threads so that they are resting upon the Beater Race. If the warp threads are above the Beater Race, they may catch and break on the Shuttle during weaving. If the warp threads are resting too heavily on the Beater Race, it may affect your fabric quality and, in extreme cases, also catch and break on the Shuttle during weaving.

- 1) Thread and fix with tape three warp threads from the bottom of the Warp Beam through the lowest heddle, then through the Reed to the top of the Breast Beam. One warp thread should be located in the center of the beams (approximate center is fine). The other two warp threads should be located on either side near the maximum weaving width of the beams (again, approximate locations are fine).



**Figure 10 - Threads for adjusting beater (seen from side)**

- 2) Loosen both bolts of one Beater Slide Rod. Then, lift or lower the Beater Slide Rod until the warp thread on this side of the loom is touching the Beater Race.



**Figure 11 - Adjustment bolt on beater**

- 3) Tighten both Beater Slide Rod bolts. Repeat on the other side of the loom.
- 4) Verify that the three warp threads now rest on the Beater Race. If they do not, repeat Step 2.

## AIR SYSTEM

You've now installed all the major framing members, the Dobby, and the Beater Assembly. It's a good time to mount the various components that comprise the Air System, before the interior of the loom becomes any more crowded.

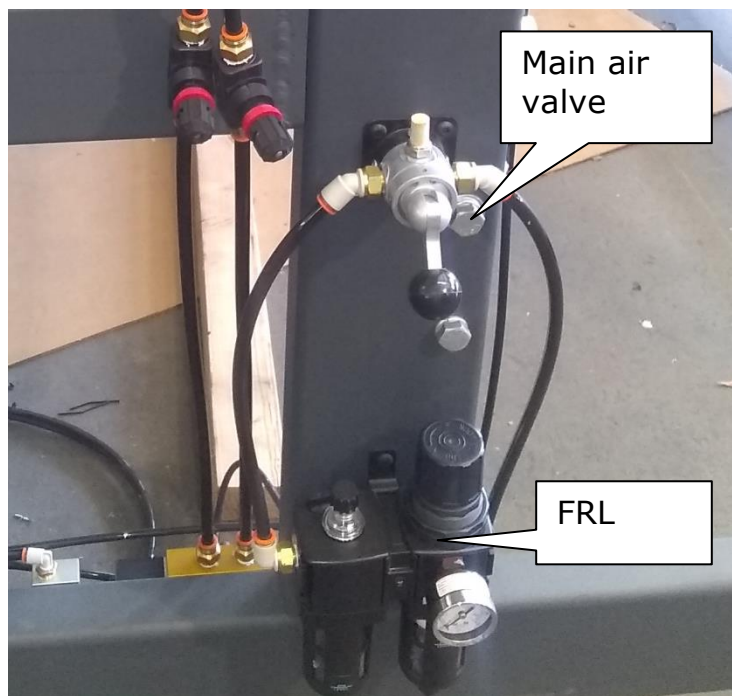
The Rug Loom will support a variety of pneumatic systems in addition to the Basic Air System. If you purchased an Air Advance, Air Shuttle, and/or an Air Beater, please refer to the appendix to connect those items. All looms will have the Basic Air System.

- 1) Please unpack the basic components and lay them out on the floor. There are several components with air tubes attached. The screws for attaching the components to the loom will be taped to each item.

### Note:

**Depending on your loom, the air tubes and matching connections will either be labeled, or color-coded.**

- 2) Begin the installation by installing the main air valve and the FRL (Filter/Regulator/Lubricator) to the outside of the right side frame.



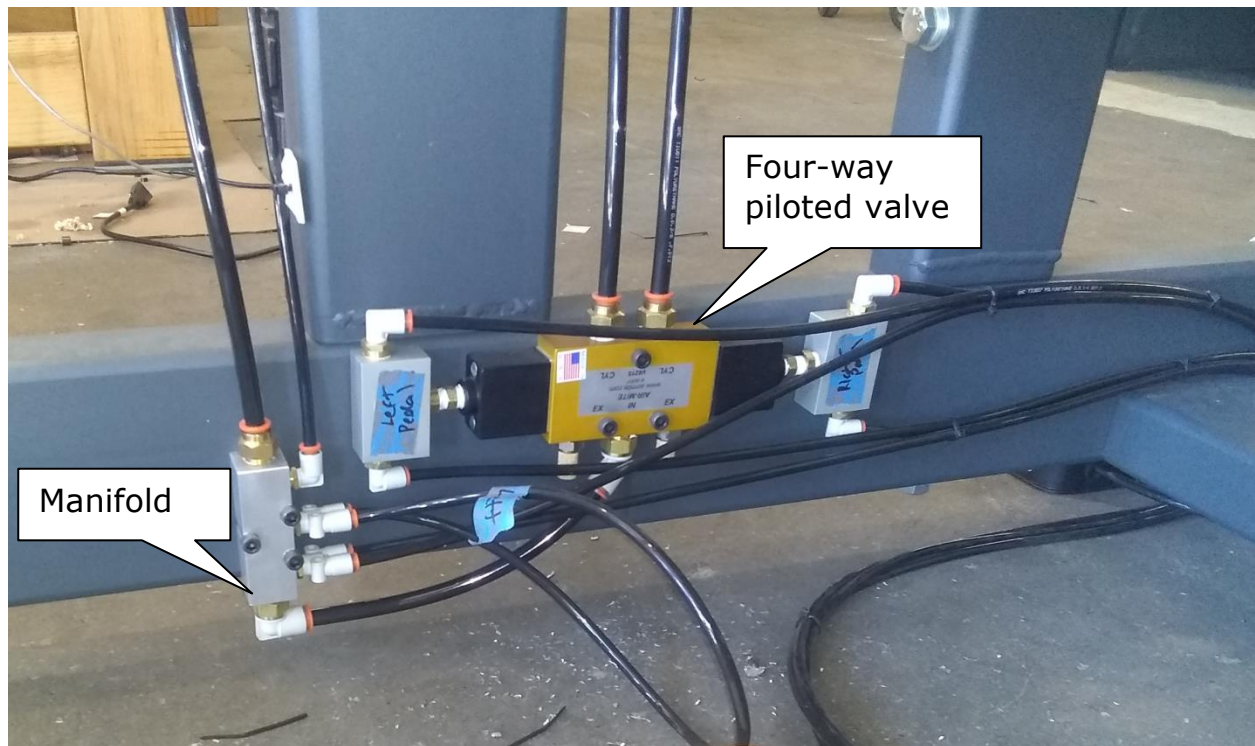
**Figure 12 - FRL on loom**

- 3) Next install the Manifold and the four-way piloted valve on the inside of the right side frame.

**Note:**

The number of tubes coming off the manifold and four-way piloted valve will vary depending on how many air components are on the loom.





**Figure 13 - Air system**

- 4) Each air tube will need to be routed to the correct spot on the loom. Use the included zip ties to attach the tubing to the frame of the loom so that everything is secure. There are white plastic anchors installed on the loom for this purpose.
- 5) Route the air tubing for the air lift or air compu-dobby up to the dobbie head installed earlier.
- 6) Route the air tubing for the brake on the warp beam to the back of the loom where the warp beam will be installed. If the warp beam will be in the upper position, the brake will be on the left side of the loom (when viewed from the weaving position).
- 7) Route the remaining air tubing for the tension system to the front of the loom where the controls for the brake will be on the weaver's right.
- 8) Place the foot control at the front of the loom and route the tubing back to the four-way piloted valve. If you have a loom that is 8' or wider, you will have two foot controls, one for each side of the loom.

**Note:**

**If you have additional tubing for optional accessories, check the appendix for routing instructions.**

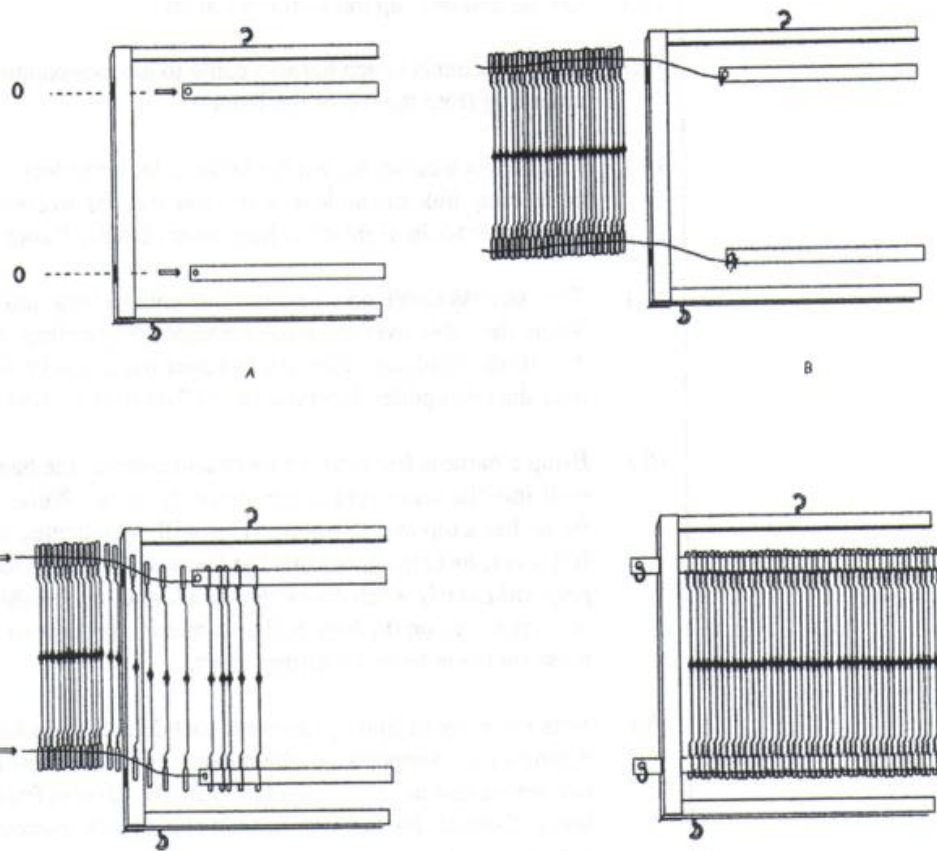
- 9) Finally, return and visually inspect each connection to be sure that no air lines have come loose. If you find a loose end, simply push it into the appropriately coded connector until you feel it seat.

## **ADD HARNESSES TO THE LOOM**

### **Add Heddles to the harnesses**

You'll need to load the heddles onto the harnesses before you hang them. This is most comfortably done on a table. We provide 100 heddles per frame with the loom. Additional heddles can be purchased at [www.avllooms.com](http://www.avllooms.com) or by calling us at 1-800-626-9615.

- 1) Locate the Harness Cables, Heddles, Springs, and Harness Frames.
- 2) Lay a harness down and remove the heddle support clips from one side, both upper and lower.
- 3) Withdraw the Heddle Supports a few inches so the ends are free of the harness frame.
- 4) Lay a bundle of heddles opposite the free ends of the supports.
- 5) The heddles are strung on cords. Tie each of the cords into the holes at the ends of the Supports.
- 6) Transfer the desired number of heddles from the bundle to the Heddle Supports.

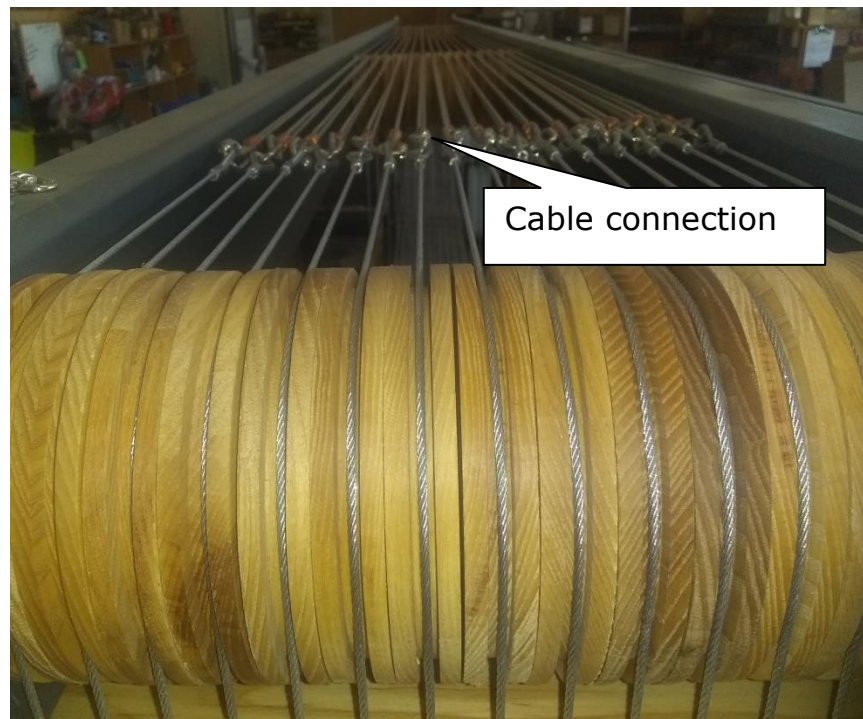


**Figure 14 - Adding heddles**

- 7) Loosen the cords, re-insert the supports, and add the clips.
- 8) Repeat for each frame.

### Connect Harness cables to dobbie

- 1) Use a Phillips screwdriver to remove the two Harness Cable Retainers that sit atop the inboard sets of Harness Pulleys. Place the cable retainers and screws in a safe place.
- 2) Locate and unwrap the Harness Cables.
- 3) You will connect each harness cable to a corresponding cable emerging from the top of the Dobbie.



**Figure 15 - Dobby cable connections**

- 4) To connect a cable, loosen the knurled locking sleeve on the oval connecting link and slide it open. Use the link to connect the Harness Cable to the right most (rear most) Dobby Cable.
- 5) The Harness Cable now has two free ends, a long and a short.

**Note:**

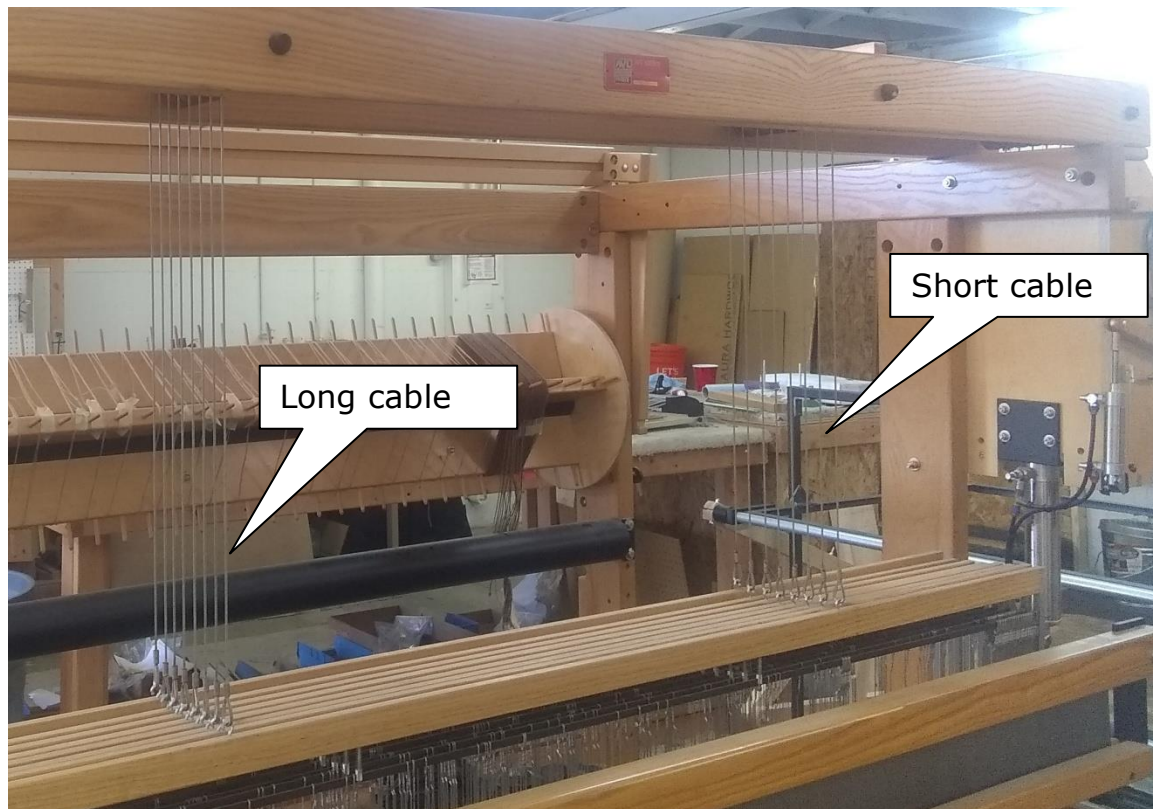
The longer looms have cables attached to the frames at four places. To do this, there are two additional cables at the end of the long and short ends of the cable. When attached to the frame, the cable will form an upside down Y.





**Figure 16 - Harness cables on longer loom**

- 6) String the cable over the three corresponding pulleys in line with it. The short leg of the cable will fall over the second pulley, the long over the third pulley.



**Figure 17 - Dobby cables**

- 7) Bring a harness frame to the loom and connect the hanging cable ends into the screweyes in the top of its frame.

**Note:**

**Each harness frame has a top and a bottom. This will be indicated on the frame. If it's not, just remember that the Harness Cables should hang straight down when connected to a harness. Also, the screweyes on the tops of the frames are set closest to the center, those on the bottom are further apart.**

- 8) When you've installed all the Harness Frames, go back and be sure that the cables are not twisted where they cross the pulleys. Check too, that each cable is properly bedded in its appropriate pulley set.
- 9) When you are satisfied that all is in order, replace the Harness Pulley Retainers. Tighten them down just enough that the felt strip on the bottom of the retainers is slightly compressed by the pulley below it. The pulley must be able to rotate as the harnesses lift or you will experience undue wear on the cable.

## Connect Spring Levers to harness

- 1) Note the array of Spring Levers suspended on axles from the Spring Lever Supports. A chain hangs from each lever. Find the two levers that are immediately below the harness frame you just hung. Connect the last link in each chain to the corresponding screw eyes in the bottom of the harness.



**Figure 18 - Spring lever connected to harness**

**Note:**

On a loom wider than eight feet, like the dobby cables, the spring lever chains connecting to the harness are shaped like a Y.



**Figure 19 - Spring lever on a wide loom**



- 2) Bring the bundle of springs with chains to the loom. Select one of these assemblies. Connect the spring end into the remaining screweye in either of the levers and the chain end into the screweye opposite.

**Note:**

**You may attach the spring to either the right or the left lever, but you must attach it to the same side for each harness.**



**Figure 20 - Harness springs attached to lever**

## CLOTH STORAGE BEAM ASSEMBLY

The beams you are about to install are extremely heavy and we advise you to have at least two robust adults on hand for handling them. A third person may be required for beams longer than 8 feet.

- 1) Locate the Cloth Storage Beam and the large Drive Gear.
- 2) Find the separate box of pillow bearings and mounting hardware.
- 3) You will first need to mount the Drive Gear to the right axle of the Cloth Storage Beam.
- 4) Remove the hardware bag marked Cloth Storage Beam from the box of pillow bearings.
- 5) Mount the gear to the axle. First slide the key into the keyway; then slip the gear over the axle and align its slot with the key;

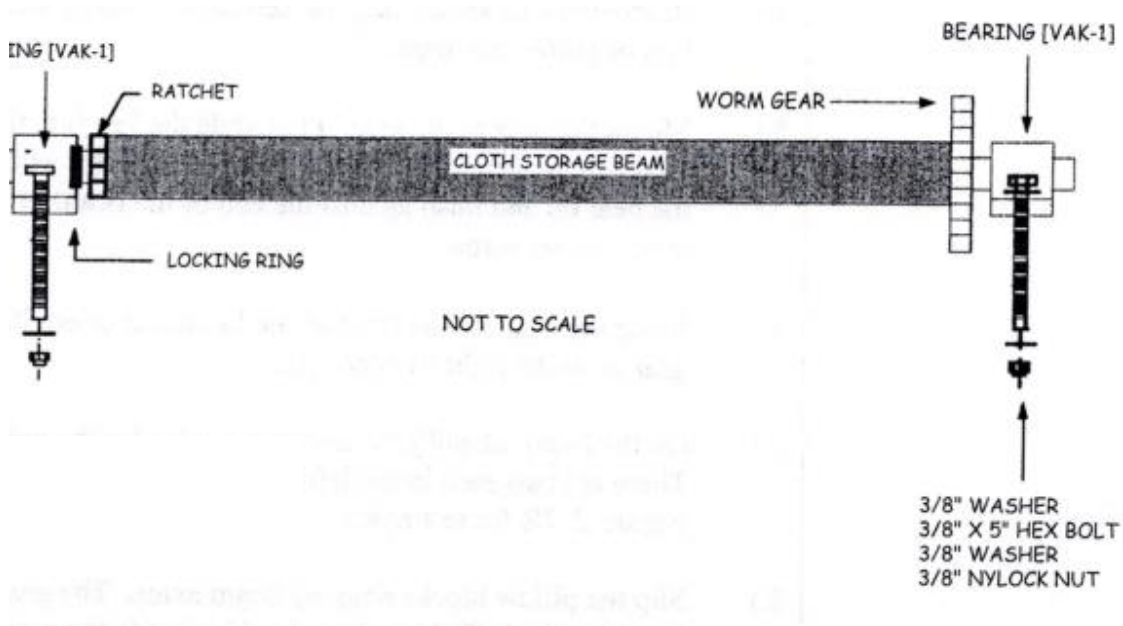


push the gear on against the end of the beam; finally, tighten down the set screw.



**Figure 21 - Gear on cloth storage beam**

- 6) Bring the beam to the front of the loom and orient it so that the gear is on the right (dobby) side.



**Figure 22 - Cloth Storage Beam**

- 7) On the loom, identify the mounting holes for the pillow blocks. There are two each in the left and right Cloth Storage Supports.

- 8) Slip the pillow blocks onto the beam axles. The grease fitting on the right block (dobby side) should point to the rear of the loom; that on the left, to the front.
- 9) You'll need to lift the beam and insert its left end through the frame. This will give you clearance to bring the right end into position over the mounting holes.
- 10) Position the pillow blocks over their mounting holes. You'll note that we have scribed index lines into the frame. Align the blocks with these lines.



**Figure 23 - Cloth storage beam and pillow block**

- 11) Add the bolts and firmly bolt the pillow blocks in place.

## CLOTH BEAM ASSEMBLY

Again, this beam is quite heavy and you'll need to observe the usual precautions. If you have a loom that is wider than 8', the cloth beam will be a steel beam that is bolted in place and does not rotate.

- 1) Bring the Cloth Beam to the front of the loom. It is symmetrical, end-to-end.
- 2) For a steel beam, place the beam on the loom and bolt it into place. Place the holes for the bolts against the loom and place the bolts through the open end of the beam to secure.



**Figure 24 - Steel cloth beam**

- 3) If you have a loom with a wood frame, follow these instructions.
  - a. Wooden blocks should already be on the axles at both ends. Remove the hardware bags from the beam, remove the four square nuts, and insert the bolts into the holes in the blocks, from the recessed side.
  - b. These blocks will rest atop the Front Verticals.



**Figure 25 - Installing Cloth Beam**

- c. Lift the beam into position now. Engage the bolt ends in the appropriate holes in the verticals.
- d. Add the four nuts and tighten down the block on one end.
- e. Rotate the beam by hand a time or two to settle the remaining block. Tighten.



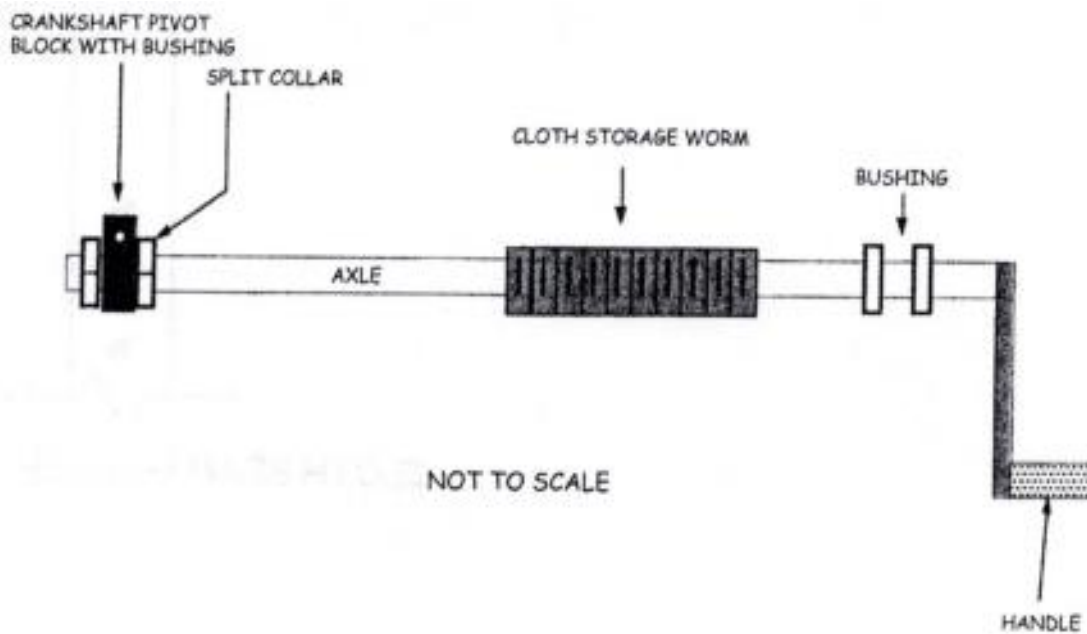
**Figure 26 - Cloth beam on wooden frame**

- f. Rotate the beam again. If it rubs at the ends, loosen one side and make whatever adjustment is needed.

## WORM DRIVE

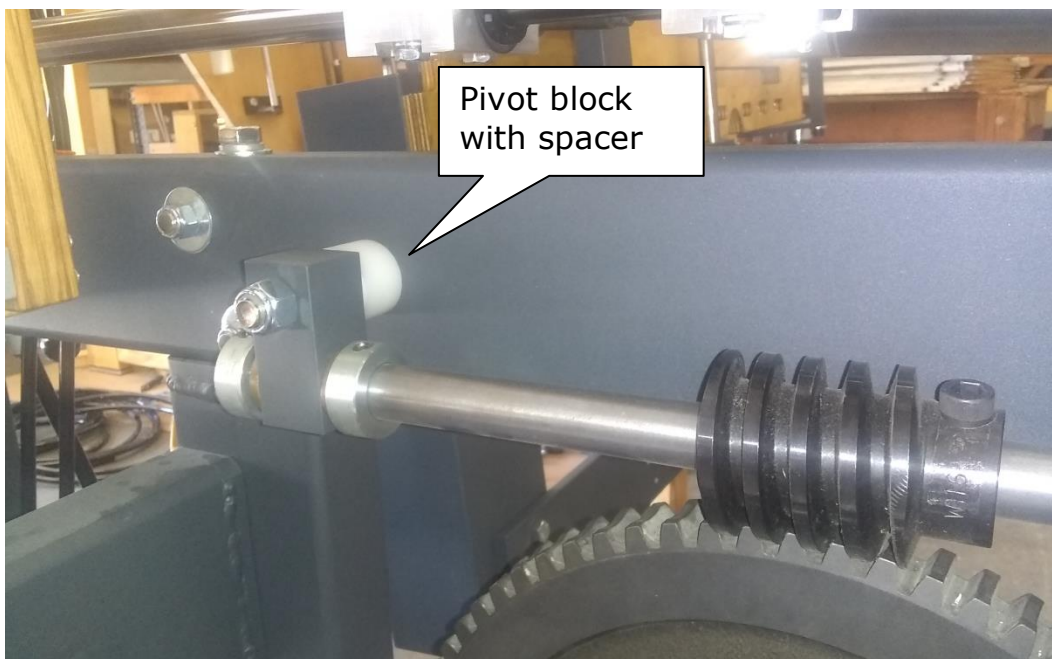
Now you will add the drive mechanism that turns the beam. You will need two 3/4" wrenches to accomplish this.





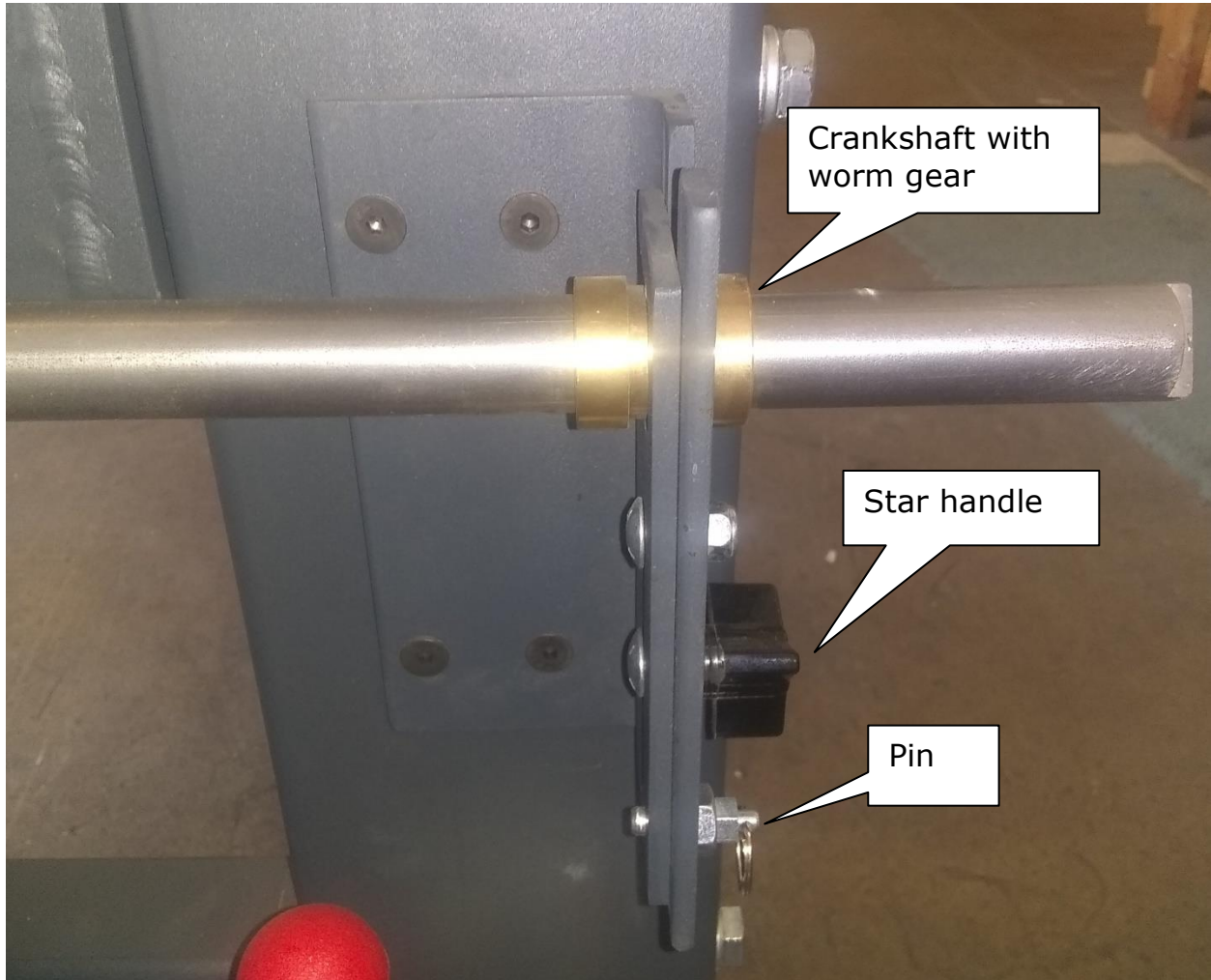
**Figure 27 - Cloth Storage Crankshaft Assembly**

- 1) Find the drive mechanism and remove the pivot bolt, pivot block, and spacer.
- 2) Bolt the pivot block to the loom with the spacer between the block and the loom.



**Figure 28 - Pivot Block for worm gear**

- 3) The sliding bracket holds the crankshaft at the front of the loom. Remove the hardware you find taped to the Sliding Bracket. Use these to secure the bracket to the inside Front Vertical.



**Figure 29 - Sliding bracket**

- 4) Note that the worm lays atop the large drive gear. Move the worm down until the two gears mesh.

**Note:**

**You may need to pull out on the small spring pin you see at the front of the bracket. Withdraw it enough to free the slide plate so that you can move the worm down. Once done, release the pin into its hole.**

- 5) Now thread the star handle into place. This handle will allow you to lock the worm up and away from the gear if you need to disengage the drive. The pull pin will keep the gears seated when

the mechanism is under strain, however, you should also keep the star handle firmly tightened when you are weaving.

- 6) Connect the Cloth Storage Crank to the front of the drive shaft.
- 7) Turn the crank in both directions. It should operate smoothly and the gears and beam should turn easily.

## SEPARATION ROLLERS

You will have one Separation Roller for each Warp Beam.

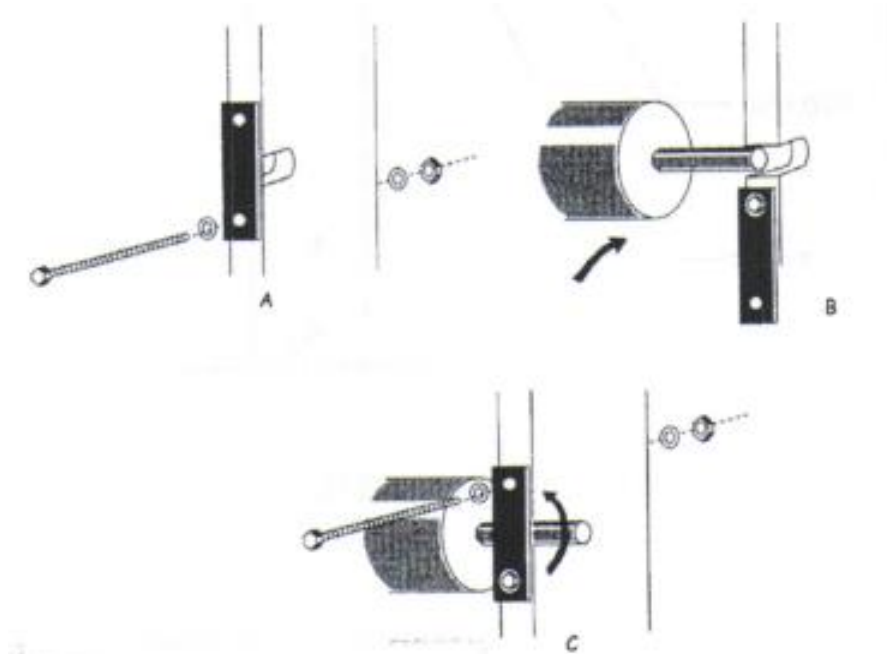
If you have a loom wider than 8', the separation rollers will be steel beams that are bolted to the frame.

If you have a loom less than 8' wide, the separation rollers are round beams that fit into the semicircular pockets in the Rear Verticals. If you plan to use your Warp Beam in the upper position, place the separation roller in the inside pockets. If you will use your Warp Beam in the lower position, place the separation roller in the outside pockets. Neither position offers a weaving advantage, but many people find it easier to work from a high beam when warping.

If you plan to mount two Warp Beams, you will use both separation rollers. When warping the loom, you will need to remember that the roller in the inside pockets goes with the upper beam and the roller in the outside pockets goes with the lower beam.

- 1) Bring a roller to the rear of the loom.
- 2) Open the hardware bag. In it you will find two flat retainers and four bolt assemblies.
- 3) Remove the hex nut and all but one flat washer on each bolt; insert a bolt with washer into the lower hole in each bracket.
- 4) Place the retainer over the pocket and lightly secure the lower bolt.
- 5) Place the roller in its pockets and rotate the retainers up. Tighten the lower bolt in each retainer.





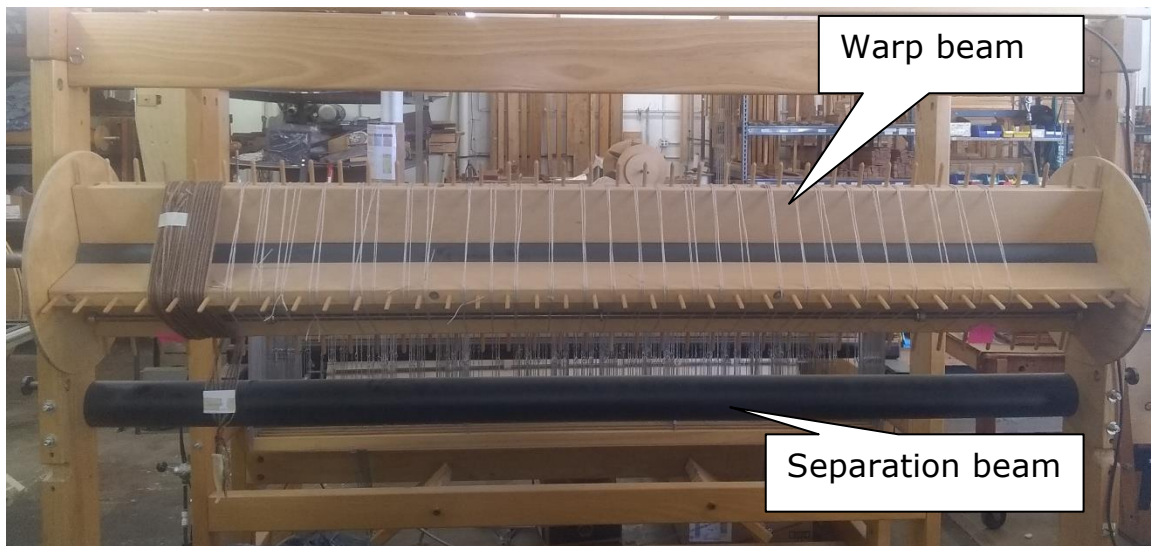
**Figure 30 - Installing Separation Roller**

- 6) Add the upper bolt at each retainer and tighten.

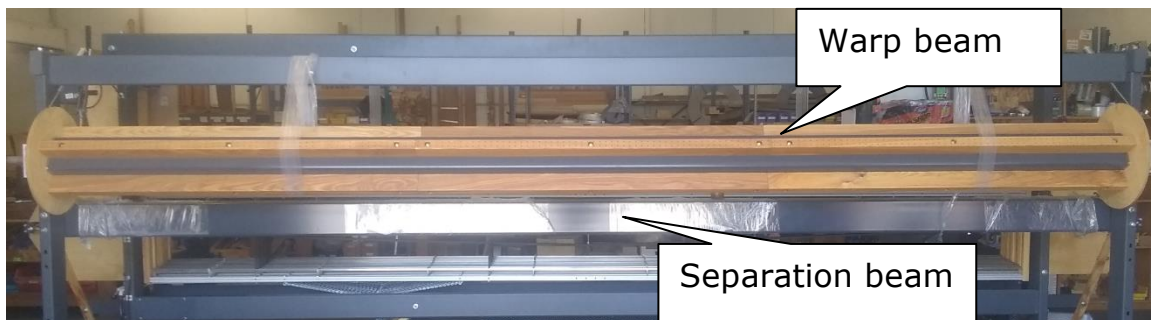
## WARP BEAMS

You will have a Sectional Warp Beam, a Plain Warp Beam, or a combination of beams. All of the warp beams are mounted in the same way.

- 1) Bring a Warp Beam to the rear of the loom.
- 2) You'll find a Pillow Block on each axle.
- 3) Remove the hardware, strip the bolts of their washers, and insert them into the mounting holes in the blocks.
- 4) Place the warp beam in either the upper or lower position depending on where you have placed the separation beam.
- 5) Lift the Warp Beam into position and push the bolts through the Verticals. Add the flat washers, lock washers, nuts, and then tighten.



**Figure 31 - Warp beam and separation beam on wooden loom**

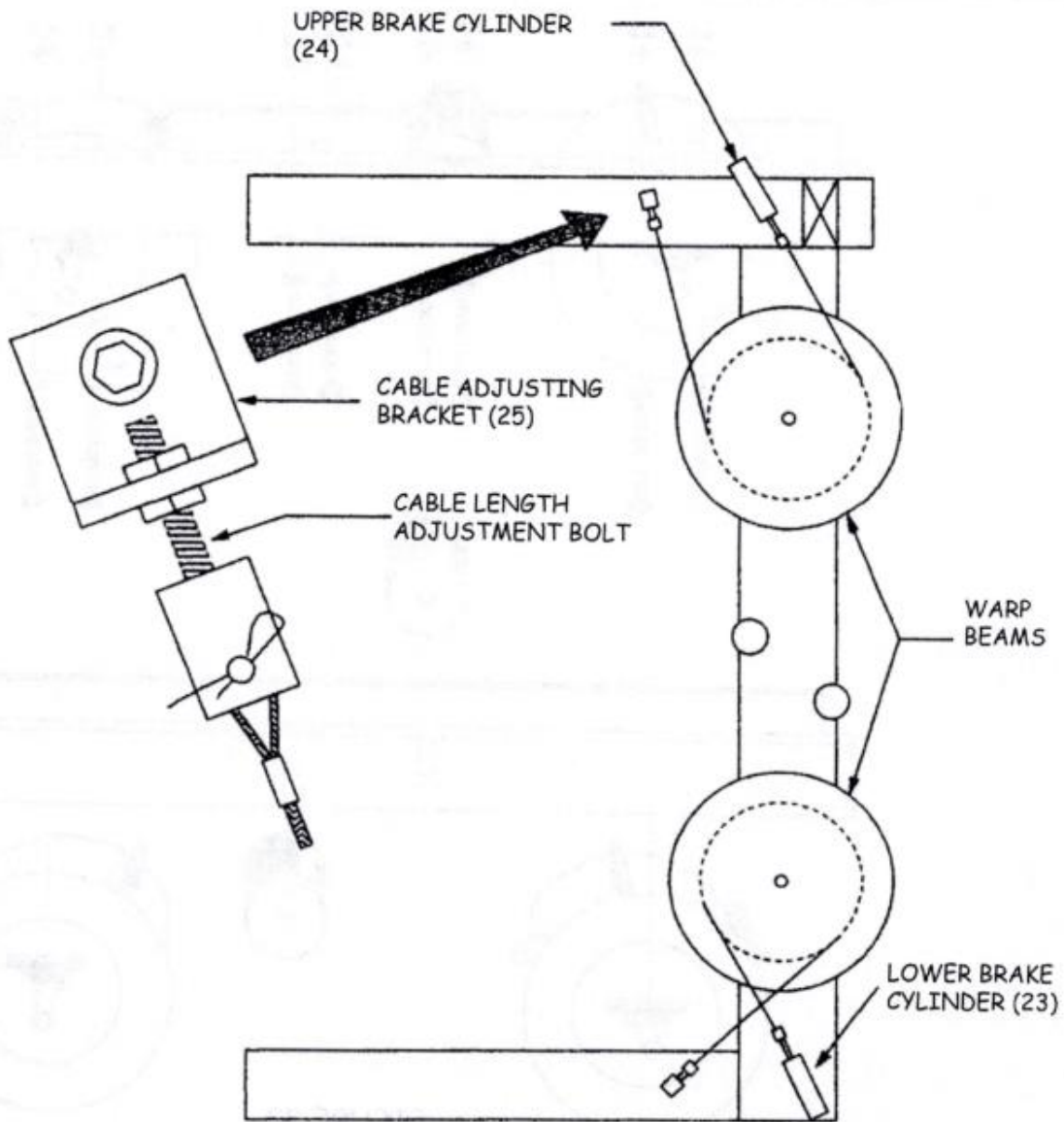


**Figure 32 - Warp beam and separation beam on steel loom**

## BRAKE CABLE ASSEMBLY

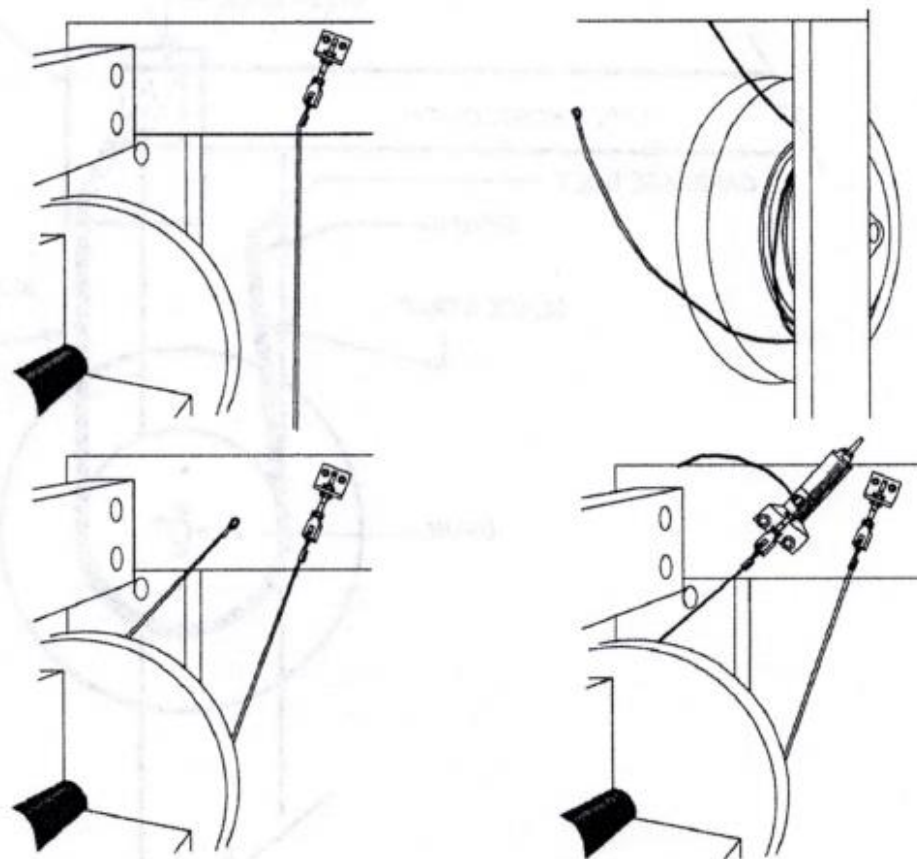
You will have one brake cable per Warp Beam for 4' and 6' Rug Looms which is installed on the left side if you are in the weaving position at the loom. Wider looms use a brake cable on each side, so you will have two cables and two brake cylinders for each warp beam.

- 1) Locate a brake cable assembly. It consists of a steel cable and a bracket with mounting hardware.
- 2) Bolt the assembly into the right side frame. Use the following diagram to determine where the assembly should be placed for either the upper or lower beam. Install a brake cable for each beam you are using.



**Figure 33 - Brake Cable Locations**

- 3) Route the brake cable(s) as indicated in the following diagram.



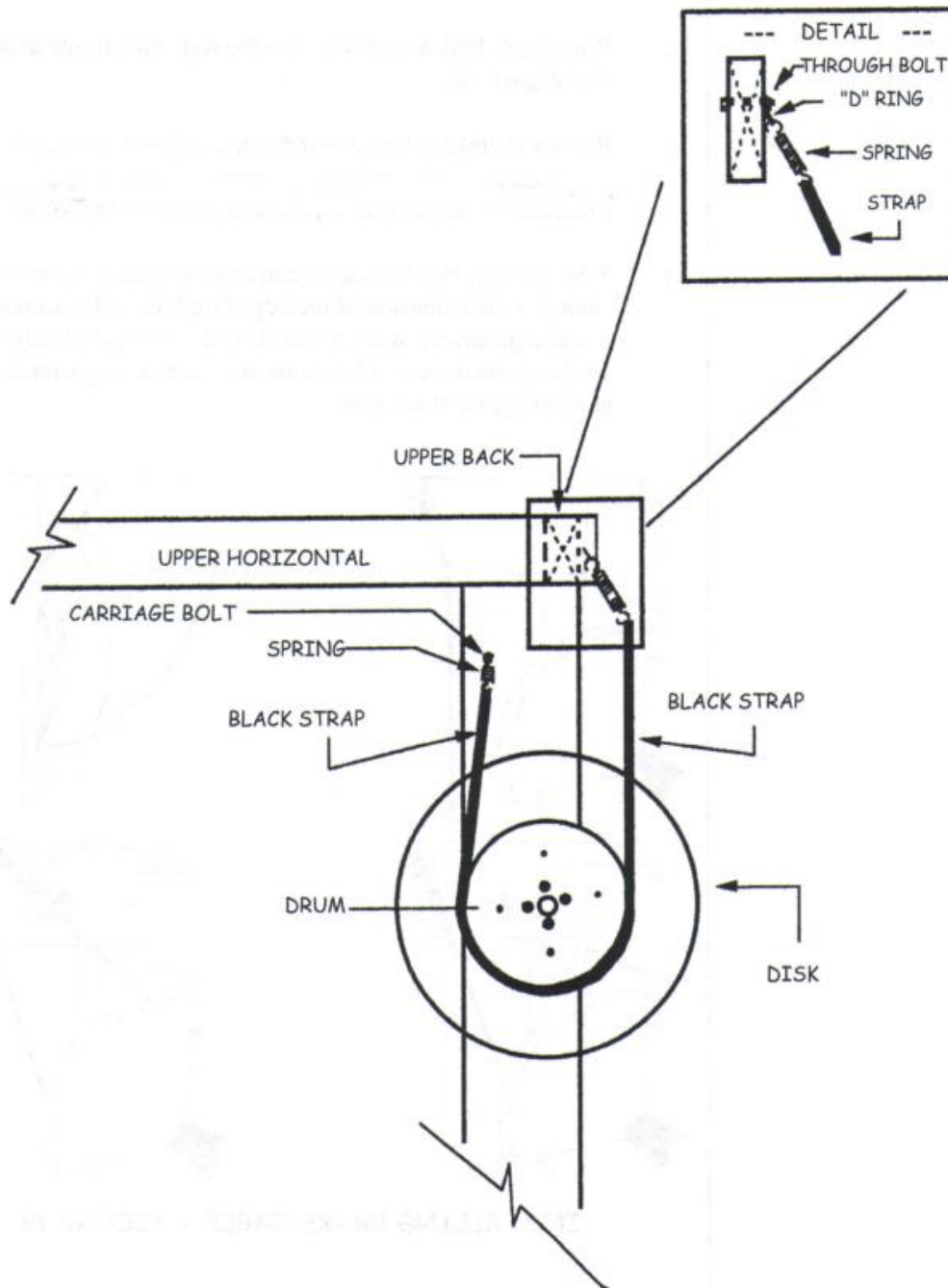
**Figure 34 - Installing Brake Cable**

- 4) Continue to the left side if you have additional brake assemblies.
- 5) You will note that the cables can be loosened or tightened by changing the extension of the adjusting bolt in the anchor brackets. These adjustments were preset at AVL and you probably won't need to change them now. Over time your cables may stretch and you'll need to tighten them a bit.
- 6) Attach the air tubes you routed through the frame earlier to the warp beam cylinders.

## **BRAKE DRAG STRAP**

A four or six foot loom will have a Brake Drag Strap on the opposite side of the Brake Assembly from the brake. It is used to help keep the beam from twisting.

- 1) Attach the spring on one end of the strap to the ring attached to the upper back horizontal



**Figure 35 - Brake Drag Strap Setup**

- 2) Wrap the strap around the drum on the beam and attach the spring on the other end to the carriage bolt as shown in the diagram.





**Figure 36 - Brake Drag Strap**

- 3) Adjust the strap as needed to maintain the beam in the correct position without twisting.

## APRON

Your Rug Loom is provided with a heavy canvas Cloth Storage Apron. This provides a convenient way to tie off your warp and conserves warp length, several yards of which would be lost if you tied directly to the Cloth Storage Beam.

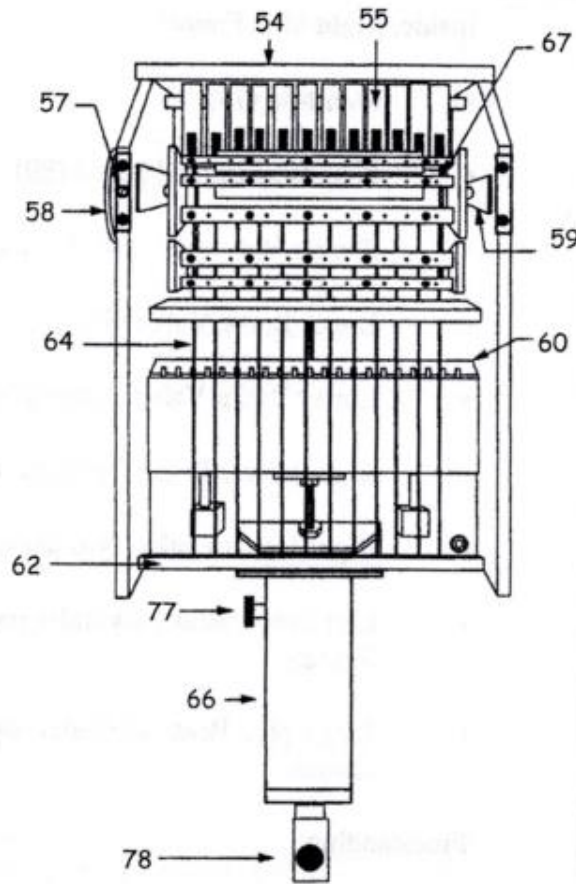
- 1) Locate and lay out the apron.
- 2) Starting about 1/4" from either end of the Cloth Storage Beam, secure the Velcro strip of the apron to that on the beam. Take care to keep this interface straight and free of wrinkles.
- 3) You have also been provided with several long steel rods. Find one now and slide it through the loops at the other end of the apron. Leave the other Apron Rod aside for now.
- 4) Use the Cloth Storage Crank to roll the apron onto the beam.
- 5) You will be instructed in the Weaving Section about tying-on to the apron.

## INSTALL THE AIR LIFT

### Note:

**You will have an air lift for a mechanical dobbie. If you have an air compu-dobby, move on to the next section.**

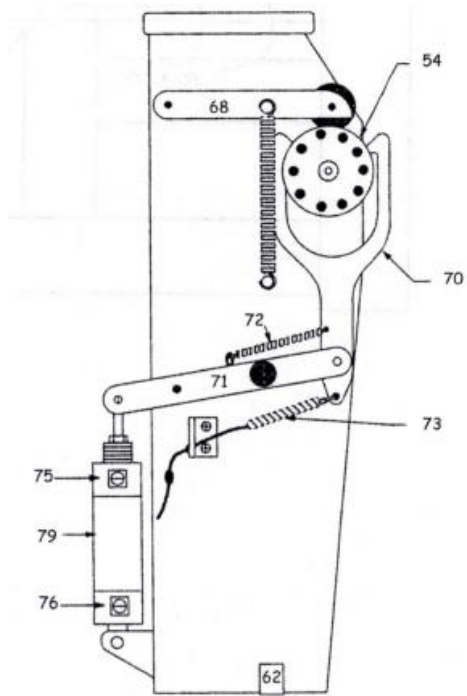
- 1) Two air lines for the air lift come up from the manifold. They each have a connection on them that allows for multiple connections.
- 2) Plug in the air lines that go to the main air cylinder for the dobbie (77 and 78). They will be color-coded or labeled to indicate where they should be plugged in.



**Figure 37 - Mechanical dobby**

- 3) Plug in the air lines that go to the advancing hook air cylinder (75 and 76) at the back of the dobby.





**Figure 38 - Mechanical dobbie side**



**Figure 39 - Air lift on loom**

## **INSTALL THE AIR COMPU-DOBBY**

- 1) Slide the Compu-dobby into the adjustment slots and secure it with the screws.
- 2) Plug in the air lines that go to the air cylinders for the dobbie. They will be color-coded or labeled to indicate where they should be plugged in.

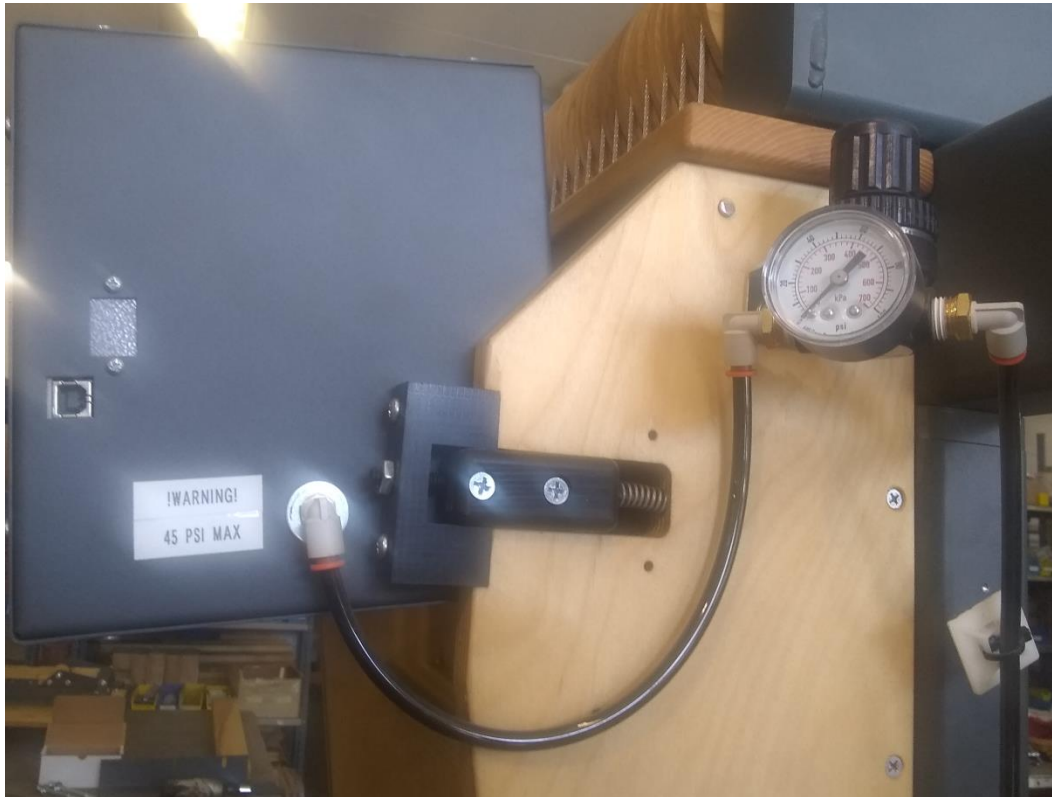


**Figure 40 - Air compu-dobby on loom**

- 3) Plug the sensor wire into the front of the compu-dobby.
- 4) Attach the regulator to the frame near the back of the doobby using the provided hardware and connect the air tubing.

**Warning:**

**When running the loom, make sure the pressure for the air compu-dobby is not adjusted above 45 psi.**



**Figure 41 - Regulator for air compu-dobby**

## CONNECT THE AIR SYSTEM

**Note:**

You should make sure all of the air components on your loom are connected before connecting and testing your air compressor. If you have optional air components, go to the appendix and complete those systems before connecting the air compressor.

### Compressor

Installations differ; for example, the air line from your compressor to your loom may be copper pipe, PVC, or flexible hose. If you are using a rigid tubing, we recommend that you fit at least a few feet of flexible hose between the FRL connection and the main line. This will prevent strain at the connection if the loom moves during weaving.

Your loom is now ready to be hooked up to a compressed air line. This line will be connected to the FRL unit. You need to purchase a fitting to hook up to your air line. For convenience, we suggest that you use a "quick disconnect" type fitting which can easily be released from the loom without any tools. You will need to buy a male fitting with either 1/4" or 3/8" pipe threads to thread into the FRL. A corresponding *female* connector will be needed for the hose end.

It's helpful if you buy a fitting that already has a sealant applied to its threads. Otherwise, wrap the threads with Teflon tape to avoid a leak. Please do not use pipe dope; it becomes scaly and can contaminate the air components.

This is your first opportunity to test the loom's function. This test will establish that your air connections are tight, that the harnesses move smoothly, and that the Warp Beam Brakes are working. We've pre-adjusted the operating speeds and pressures, but you may need to add a few minor tweaks to achieve a particular result. It's always possible that something was put out of adjustment in handling.

- 1) Once the loom has been hooked up to an air line, set the regulator to a pressure range that will operate the cylinder to your satisfaction.
- 2) Put the Main Air Valve handle in the OFF position.
- 3) Turn on the compressor.
- 4) Listen for air leaks in your main air delivery line.
- 5) Open the Main Air Valve.
- 6) Start the FRL at about 75 PSI. You may wish to change this adjustment when you change weaving patterns as you will find that a higher pressure is needed when you are lifting more harnesses.

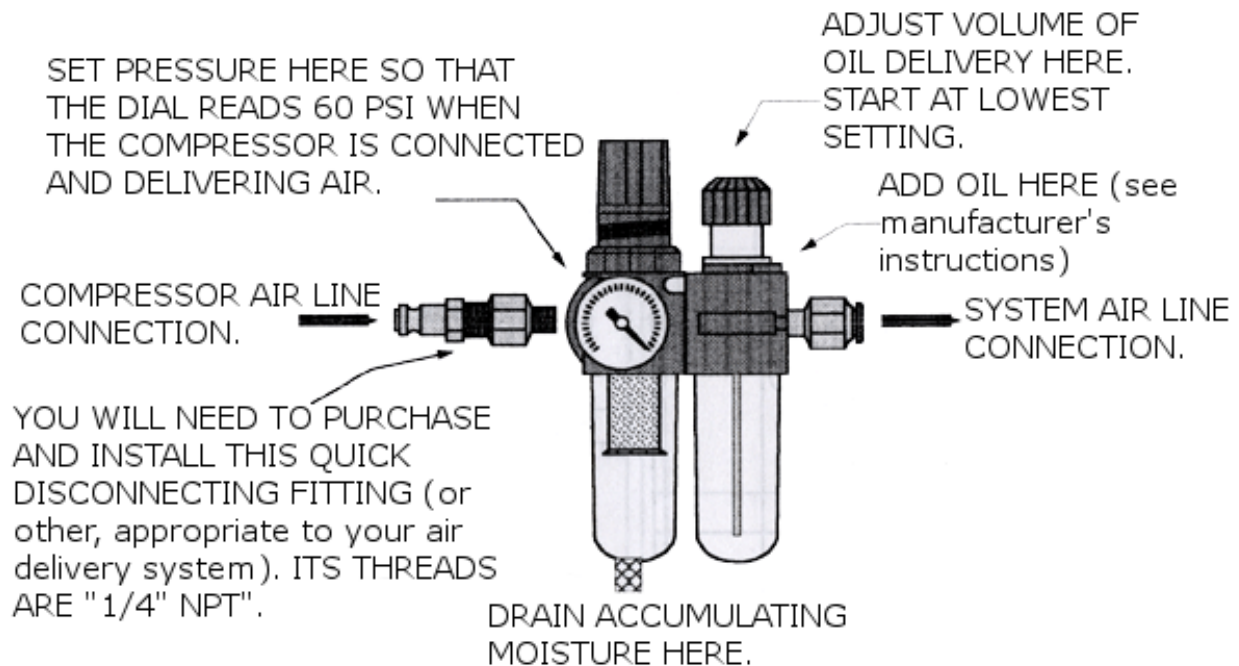
**Note:**

**We pre-set the pressure at the FRL at 75 p.s.i. Please check it now and re-calibrate the dial if necessary. Your loom will operate at between 75 and 120 p.s.i., but it's best to start at the lower setting.**

- 7) The dobbie can now be activated by depressing the foot valve. The speed of how quickly the harnesses lift (your weaving speed) can be further altered by adjusting the flow control valves.



- 8) Test out any other air components on your loom.



**Figure 42 - FRL Detail (may vary)**

## MAINTAINING YOUR SYSTEM

- 1) Check the FRL weekly (if you use your loom daily).
- 2) Drain the filter bowl if you note a build up of condensation. There's a drain plug at the bottom of the bowl.
- 3) Check and tighten the bolts as needed.
- 4) Adjust the various mechanisms as needed.

**NOTE:**

**Please disconnect the air from your compressor before you drain your system.**

### Add Oil

We provided you with a small bottle of lubricating oil. Consult the manufacturer's instruction sheet for an explanation of how to add oil at the FRL. Once you've added the oil, set the lubrication meter at its lowest value. Your air system requires almost no oil and too much can foul the system.

## OTHER LOOM MAINTENANCE

### Lubrication

The worm gear for the cloth storage beam needs to be lubricated occasionally. You will need Clear Grease (we recommend Tri-Flow brand). It can be found at bicycle shops.



**Figure 43 - Clear Grease (Tri-Flow)**

Dab some grease on top of the worm gear. Make sure the worm gear meshes with the drive gear and crank the cloth beam handle a few times to distribute the grease.





# **APPENDIX – OPTIONAL FEATURES**

## AIR SHUTTLE INSTALLATION AND ADJUSTMENTS

Congratulations on your purchase of the AVL Air Shuttle system. We hope it provides you years of productive weaving. You may have either a one-box air shuttle or a four-box air shuttle.

Installation of the Air Shuttle occurs after the installation and proper adjustment of the Beater as the Beater height adjustment affects the Air Shuttle adjustment.

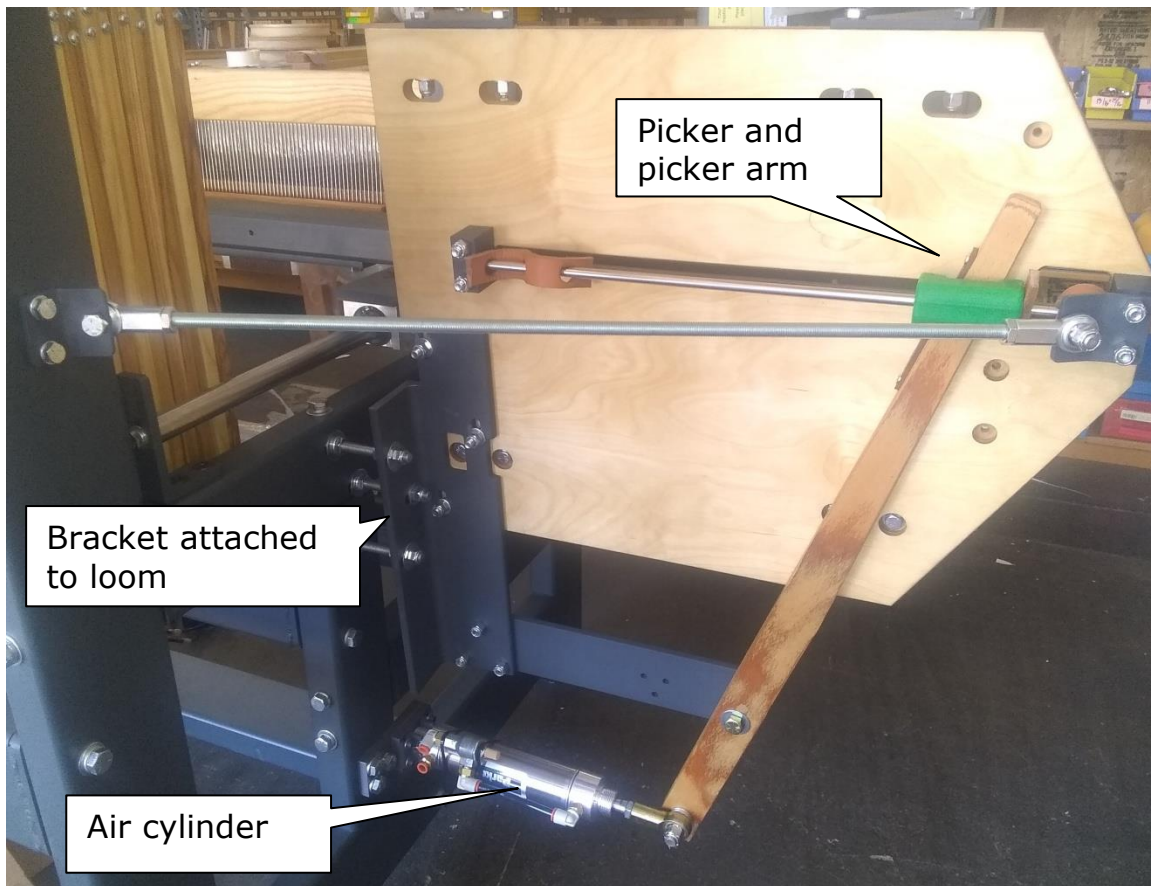
Before proceeding with the Air Shuttle installation, please install the Beater as described in the Rug Loom Manual provided with your loom. Ensure that the Beater height is adjusted to allow a taut warp thread to rest lightly upon the Beater Race. See page 26 for complete instructions.

### To Install the Air Shuttle Assembly

The Air Shuttle system contains two major components: the left and right Shuttle Boxes.

It also contains several minor components, including pneumatics, firing switch (or foot pedal), and beater location sensor. Depending on the options you requested, it may include a control box or a power box.

- 1) Attach the Air Shuttle Control Box or power box to the right side of the loom using the hardware provided.
- 2) Attach the pneumatic hoses to the manifold. The hoses will either be color or numerically coded to guide you. The longer set of hoses will attach to the left side Air Shuttle Picker Cylinder. Route the hoses to their approximate locations on either side of the Beater. The left side will be routed along the Spring Lever Support Cross member.
- 3) The firing switch may be attached to the beater or handheld. In either case, make sure the wiring for the switch is routed through the loom to the correct location.
- 4) Attach the left-side Air Shuttle Box to the left side of the loom using the hardware (three bolts and washers) provided. The bolts should be left hand-tight as you will shortly be adjusting the boxes.



**Figure 44 - Left shuttle box from rear**

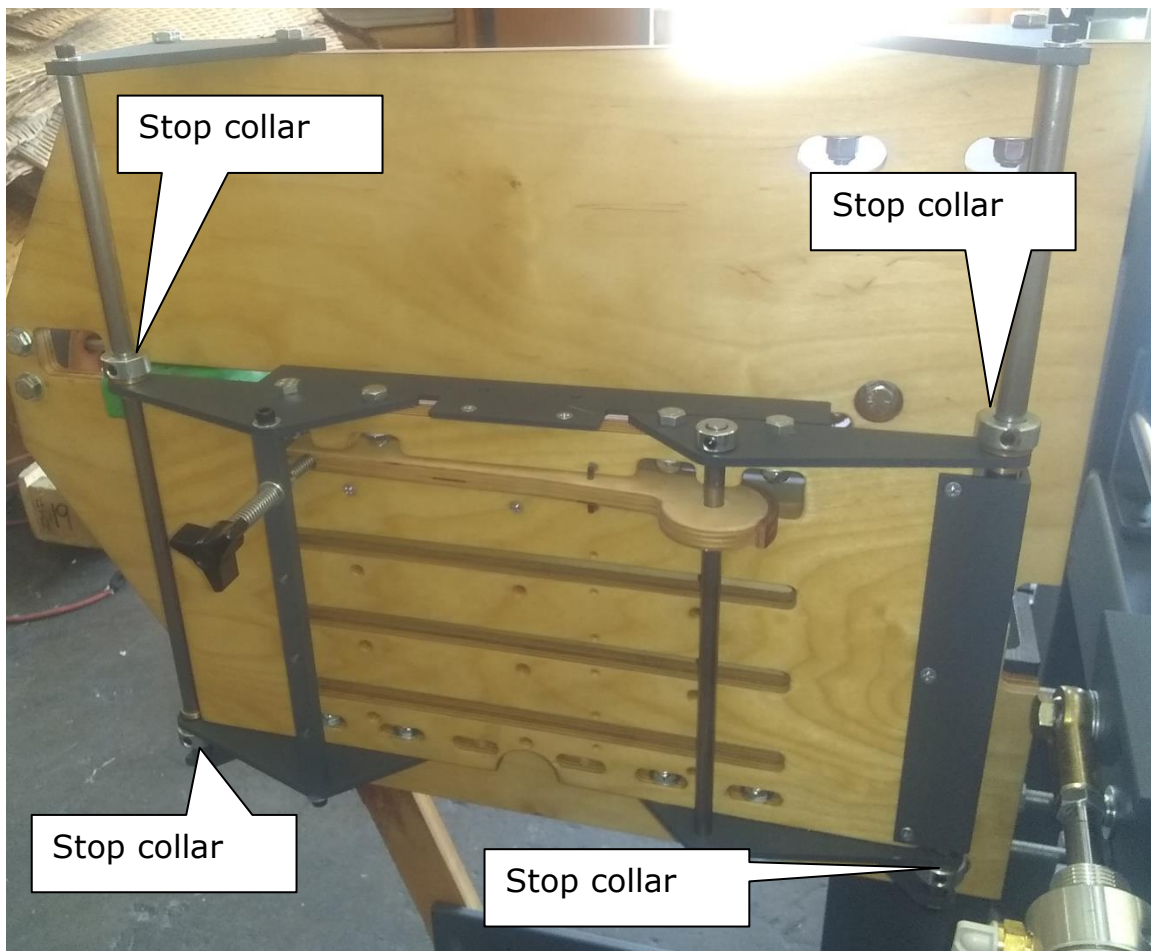
- 5) Attach the Picker Cylinder to the left side of the loom using the hardware and the spacer provided. Attach the correct pneumatic hoses to the Picker Cylinder. Mount the pneumatic hoses to the wire tie mounts attached to the Lower Harness Support Cross member with the wire ties provided.
- 6) If not already attached, attach the Picker Arm to the Picker Cylinder, Pivot Point, and the Picker with the hardware provided.
- 7) You may also have a brace connecting the shuttle box to the loom. Attach the brace using the provided hardware.
- 8) With the Beater at the home position (closest to the harnesses), tilt and maneuver the Air Shuttle Box until the shuttle cavity is positioned slightly above and at an angle that is the same as or slightly greater than the tilt of the Beater Race.

**Note:**

**The Beater Race is slightly tilted towards the Harnesses to help keep the**

shuttle on the Beater Race as it flies across. Tighten the mounting bolts that hold the Air Shuttle Box in this position.

- 9) For the next step, you will need a straightedge of one-to-two feet long. Slide the straight-edge along the beater until it reaches the Shuttle Shelf in the Air Shuttle Box. There should be a very slight (1/16 inch or less) height difference with the Beater Race being slightly lower causing the straight edge to catch as it is slid up and onto the Shuttle Shelf. This height adjustment is approximate and need not be exact.
- 10) Perform fine adjustments on the height of the Shuttle Shelf using the stop collars on the outside support rod of the Air Shuttle Box.



**Figure 45 - Left shuttle box from front**

- 11) Loosen the screws on the top and bottom collars with the provided allen wrench and raise or lower the Shuttle Shelf as required. When done correctly, a slight gap can be seen between the straight edge and the Beater Race when resting the straight

edge across the Shuttle Shelf/Beater Race. Re-tighten the collar screws once the fine adjustment is complete.

- 12) Repeat these steps for the right side Air Shuttle Box.

## AIR BEATER

There is an air cylinder for each side of the beater which are attached to the top of the loom frame.

- 1) Select the screws from the hardware pack and use them to mount the Beater Air Cylinder in the holes at the front of the frame.



**Figure 46 – Air Cylinder**

- 2) Bolt the other end of the cylinder to the end of the bracket attached to the beater.
- 3) Attach the air tubing which has been routed from the manifold to the proper locations.

## AUTOMATIC ADVANCE

The Automatic advance consists of several components which work together to move the warp and the finished cloth smoothly through the loom. The air brake on the warp beam is replaced with tension arms with weights that allow the warp to advance automatically. The cloth beam and the cloth storage beam are connected to gears run by the air system. A pressure roller is added to the loom to keep the tension correct.



The automatic advance is customized to your loom, so there may be differences from the instructions here. Depending on your loom, there may be mechanisms and tension arms on both sides of the loom.

### **Cloth Storage Beam Assembly**

The beams you are about to install are extremely heavy and we advise you to have at least two robust adults on hand for handling them. A third person may be required for beams longer than 8 feet.

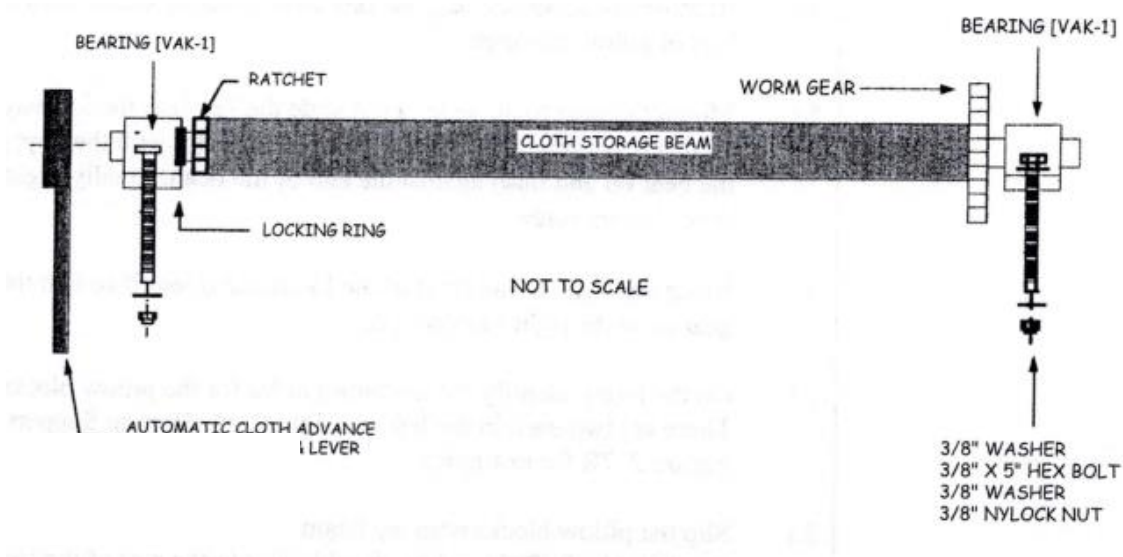
- 1) Locate the Cloth Storage Beam and the large Drive Gear.
- 2) Find the separate box of pillow bearings and mounting hardware.
- 3) You will first need to mount the Drive Gear to the right axle of the Cloth Storage Beam.
- 4) Remove the hardware bag marked Cloth Storage Beam from the box of pillow bearings.
- 5) Mount the gear to the axle. First slide the key into the keyway; then slip the gear over the axle and align its slot with the key; push the gear on against the end of the beam; finally, tighten down the set screw.



**Figure 47 - Gear on cloth storage beam**

- 6) Bring the beam to the front of the loom and orient it so that the gear is on the right (dobby) side.





**Figure 48 - Cloth Storage Beam**

- 7) On the loom, identify the mounting holes for the pillow blocks. There are two each in the left and right Cloth Storage Supports.
- 8) Slip the pillow blocks onto the beam axles. The grease fitting on the right block (dobby side) should point to the rear of the loom; that on the left, to the front.
- 9) You'll need to lift the beam and insert its left end through the frame. This will give you clearance to bring the right end into position over the mounting holes.
- 10) Position the pillow blocks over their mounting holes. You'll note that we have scribed index lines into the frame. Align the blocks with these lines.



**Figure 49 – Pillow Block and Auto Advance**

- 11) Add the bolts and lightly bolt the pillow blocks in place. The beam needs some movement so that you will be able to place the auto advance mechanisms in place.
- 12) Just below the pillow block is a hole for the Auto Advance mechanism. From the outside of the hole position the Mechanism.
- 13) On the inside of the hole, connect the gear to the mechanism, then bolt them together.



**Figure 50 - Cloth Storage Auto Advance**

- 14) Position the beam so that the ratchet and auto advance gear mesh together.
- 15) Tighten the bolts on the pillow block so that the beam is held in position.
- 16) Bolt the air cylinder into place on the outside of the loom and connect it to the auto advance mechanism.
- 17) Route the tubing through the loom and connect it to the air cylinder.

### **Cloth Beam Assembly**

Again, this beam is quite heavy and you'll need to observe the usual precautions. If you have a loom that is wider than 8', the cloth beam will be a steel beam that is bolted in place and does not rotate.

- 1) Bring the Cloth Beam to the front of the loom. It is symmetrical, end-to-end.
- 2) Plastic blocks should already be on the axles of the beam at both ends. Remove the hardware bags from the beam, remove the four square nuts, and insert the bolts into the holes in the blocks, from the recessed side.



**Figure 51 – Block on cloth beam**

- 3) These blocks will rest atop the Front Verticals.



**Figure 52 - Installing Cloth Beam**



- 4) Lift the beam into position. Engage the bolt ends in the appropriate holes in the verticals.
- 5) Add the four nuts and tighten down the block on one end. Leave some movement so that you can connect the gears for the beam and the auto advance mechanism.
- 6) Just below the pillow block is a hole for the Auto Advance mechanism. From the outside of the hole position the Mechanism.



- 7) On the inside of the hole, connect the gear to the mechanism, then bolt them together.



**Figure 53 - Cloth Storage Auto Advance**

- 8) Position the beam so that the ratchet and auto advance gear mesh together.
- 9) Rotate the beam by hand a time or two to settle the remaining block. Tighten.
- 10) Rotate the beam again. If it rubs at the ends, loosen one side and make whatever adjustment is needed.
- 11) Tighten the bolts on the pillow block so that the beam is held in position.
- 12) Bolt the air cylinder into place on the outside of the loom and connect it to the auto advance mechanism.
- 13) Route the tubing through the loom and connect it to the air cylinder.



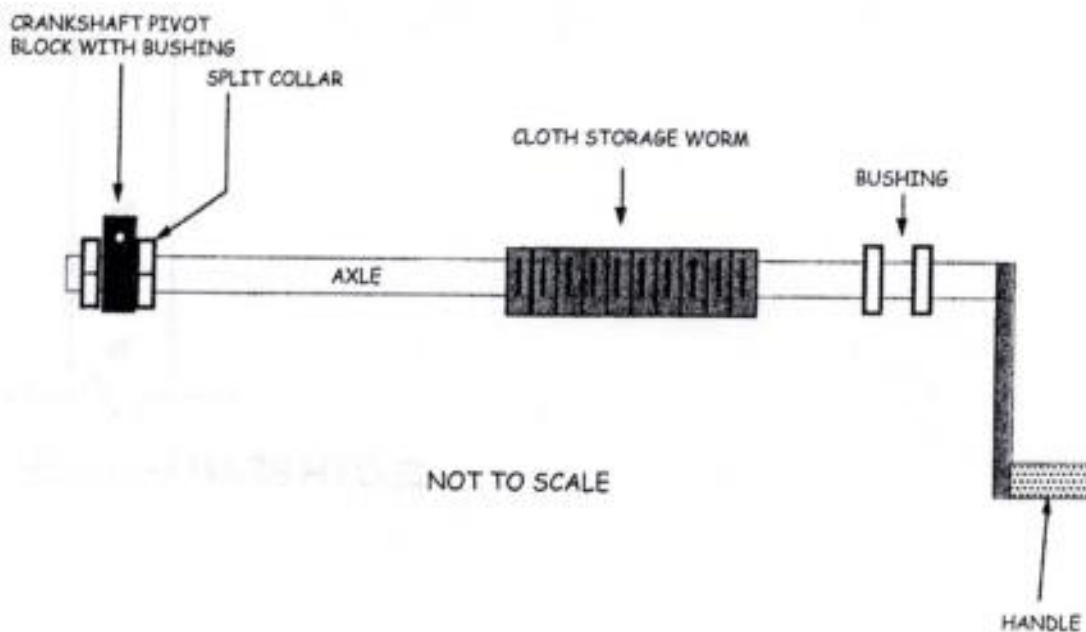
## Pressure Rollers

The Pressure Rollers have been clearly labeled Back and Front (referring to the front of the loom). They have been placed in the crate in the proper position. It is critical that the Pressure Rollers go on in the correct orientation. They won't fit any other way and the other gears, particularly for the Automatic Advance and Cloth Beam, won't fit if they are incorrectly situated.

- 1) Drop the pressure roller into the slots on the pillow block holding the cloth beam.

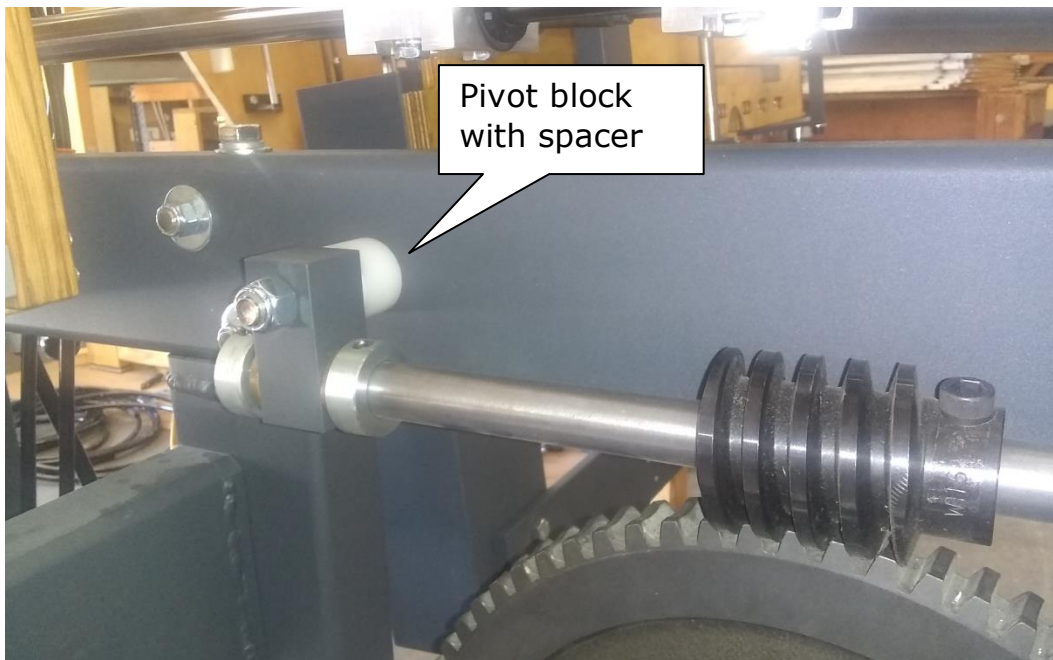
## Worm Drive

You will add the drive mechanism that allows you to turn the beam manually. You will need two 3/4" wrenches to accomplish this.



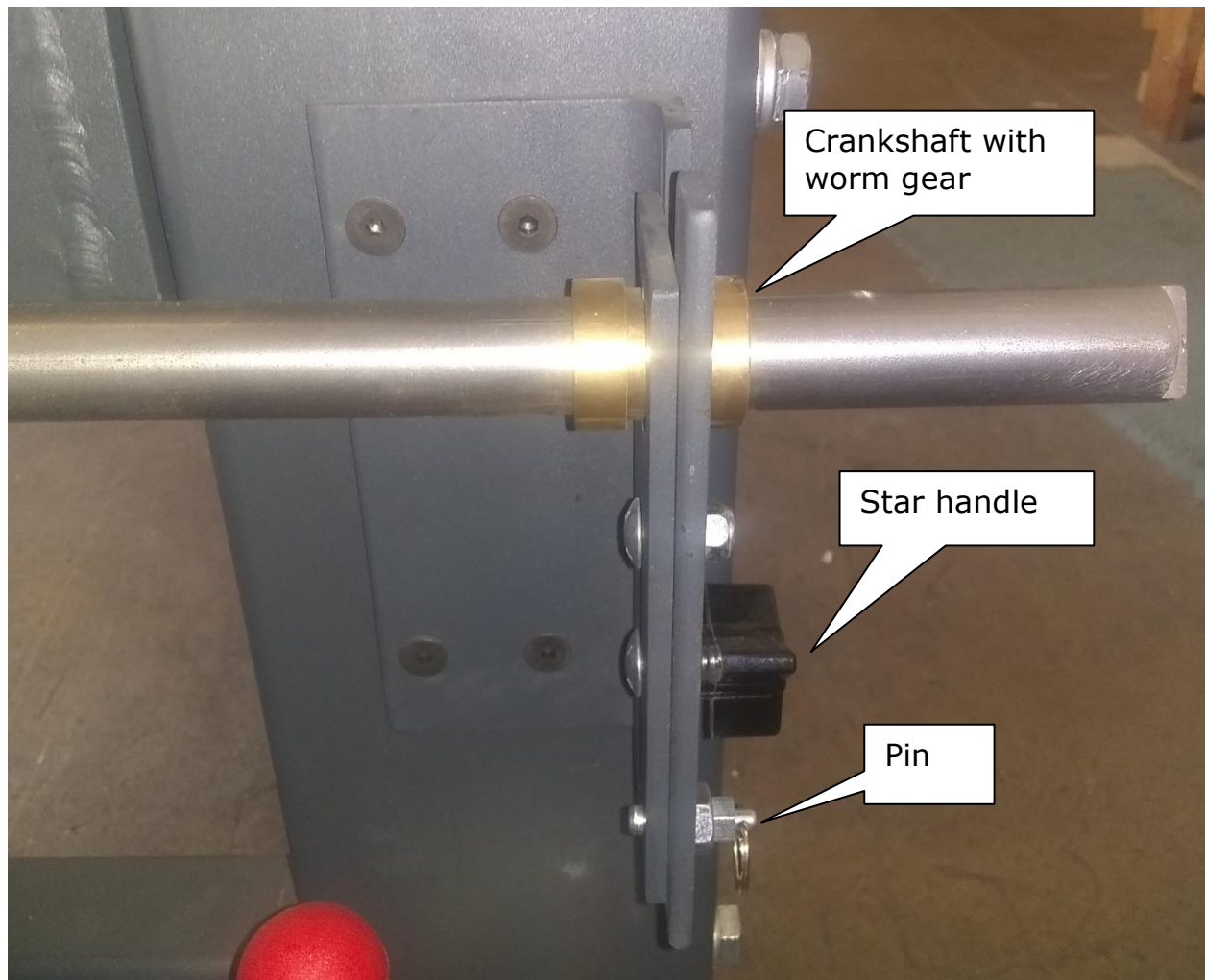
**Figure 54 - Cloth Storage Crankshaft Assembly**

- 1) Find the drive mechanism and remove the pivot bolt, pivot block, and spacer.
- 2) Bolt the pivot block to the loom with the spacer between the block and the loom.



**Figure 55 - Pivot Block for worm gear**

- 3) The sliding bracket holds the crankshaft at the front of the loom. Remove the hardware you find taped to the Sliding Bracket. Use these to secure the bracket to the inside Front Vertical.



**Figure 56 - Sliding bracket**

- 4) Note that the worm lays atop the large drive gear. Move the worm down until the two gears mesh.

**Note:**

**You may need to pull out on the small spring pin you see at the front of the bracket. Withdraw it enough to free the slide plate so that you can move the worm down. Once done, release the pin into its hole.**

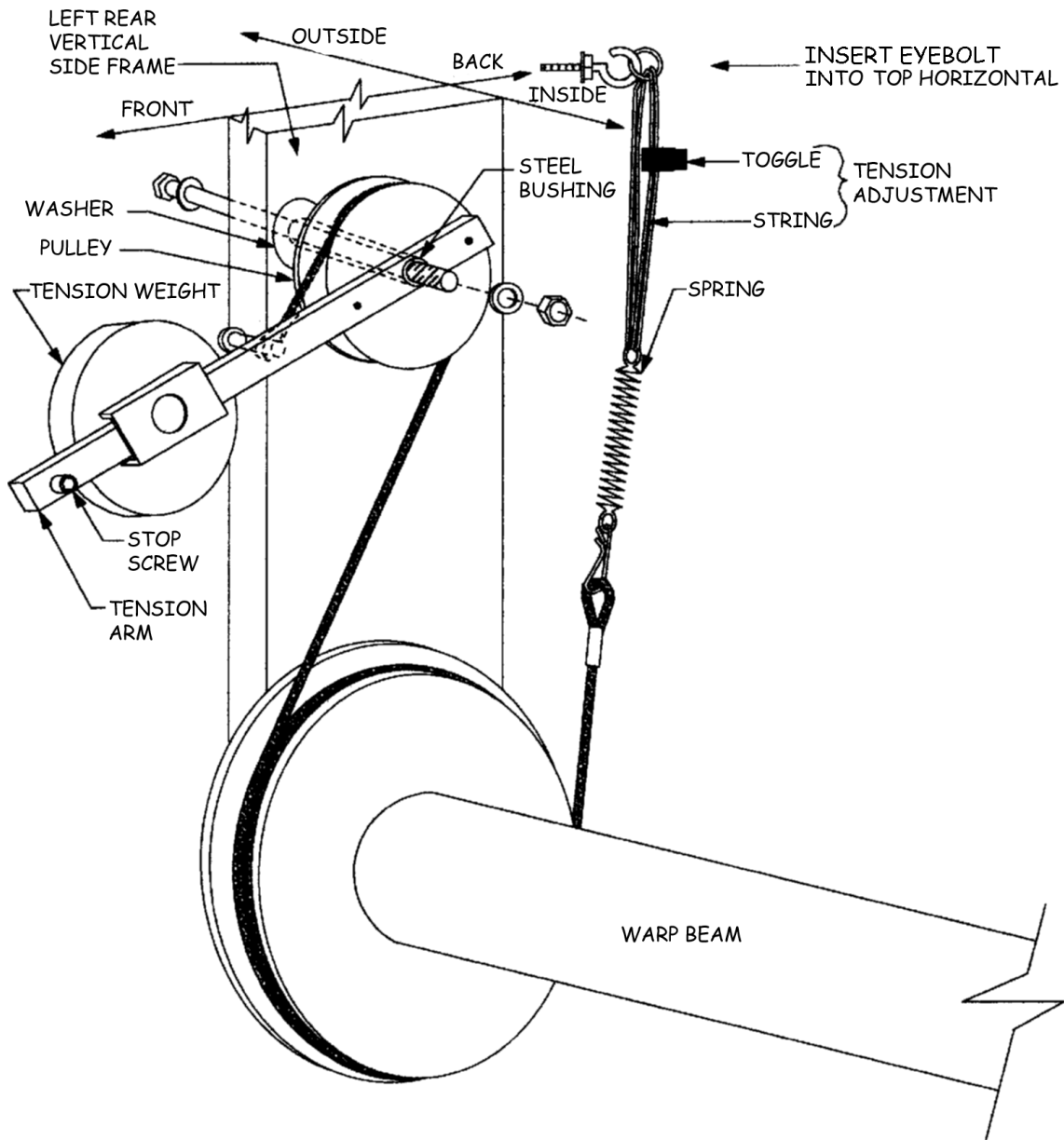
- 5) Now thread the star handle into place. This handle will allow you to lock the worm up and away from the gear if you need to disengage the drive. The pull pin will keep the gears seated when the mechanism is under strain, however, you should also keep the star handle firmly tightened when you are weaving.
- 6) Connect the Cloth Storage Crank to the front of the drive shaft.

- 7) Turn the crank in both directions. It should operate smoothly and the gears and beam should turn easily.

### Tension Arm Installation

The brake cords will vary depending on the type of beam you are using and whether you are using a beam in the upper or lower position.

- 1) Find the tension arm and place it so that the face of the pulley lies against the inside of the left rear vertical.



**Figure 57 - Upper Position Tension**

- 2) Remove the long bolt (with its nut and washers) from the pulley end of the tension arm.
- 3) Put one of the washers back on the bolt and push the bolt through the upper hole in the left rear vertical from the outside.
- 4) Put another washer on and slip the tension arm (with its metal bushing) onto the bolt.
- 5) Add another washer, then the hex nut, and tighten it down.
- 6) After tightening, check to make sure the arm swings freely.

#### Attach the Tie-up (Cord or Cable)

- 1) Find the tension arm cable (#38S) for the one yard sectional beam or the tension arm cord (#38P) for the ½ yard sectional or plain beam.
- 2) Attach the cable or cord to the tension arm by removing the shoulder bolt (the bolt near the wooden pulley) using a 5/32" Allen wrench and place this bolt through the looped end of the cable or cord and replace the bolt into the tension arm.
- 3) The cable comes from the bolt in the tension arm, over the top of the tension arm pulley, and down around the front of the sectional beam brake drum.



**Figure 58 - Tension Cable around Brake Drum**

- 4) Wrap the cable around the sectional beam drum three times (as shown) with the first wrap toward the outside of the loom.

### Tension Cord Adjustment

- 1) At the end of the cable or cord assembly is an eyebolt.
- 2) Remove one hex nut and washer from the eyebolt and insert it (from the inside of the loom) through the hole at the very back of the upper left horizontal frame piece.



**Figure 59 - Upper Tension Tie-up**

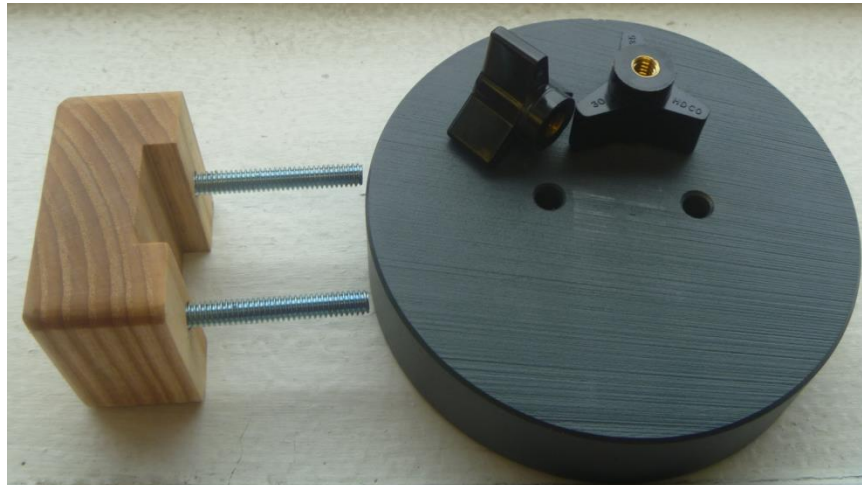
- 3) Replace and tighten the hex nut and washer on the eyebolt.

### Tension Arm Weight Instructions

The tension arm weight provides the weight for the tension arm assembly, allowing you to easily adjust the tension on the warp beams. Once the arm is installed on either position, adding the weight is the same.



- 1) Find the tension arm weight. It is a heavy black disk with a wooden bracket on one side of it.
- 2) To attach the weight to the arm, you will need to remove the black knobs and wooden bracket from the weight.



**Figure 60 - Weight with wooden bracket removed**

- 3) Position the weight so that the knobs will be accessible to you.
- 4) Slide the wooden bracket and bolts back through the weight (the arm should be in between the weight and bracket).



**Figure 61 - Tension Arm with Weight**

- 5) Re-attach the two black knobs and tighten down.

The weight will stay anywhere on the tension arm that you place it as long as you tighten the knobs on the weight. The screw at the end of the arm serves as a stop to keep the weight from accidentally slipping off. Proper adjustment of the tension arm is covered in the Weaving manual.



# WEAVING INSTRUCTIONS

**Note:** Unless otherwise noted, the instructions in this section are basic, general instructions for weaving and are applicable to many AVL and non-AVL looms. They should not be regarded as a substitute for training or experience.

## WARPING THE PLAIN BEAM

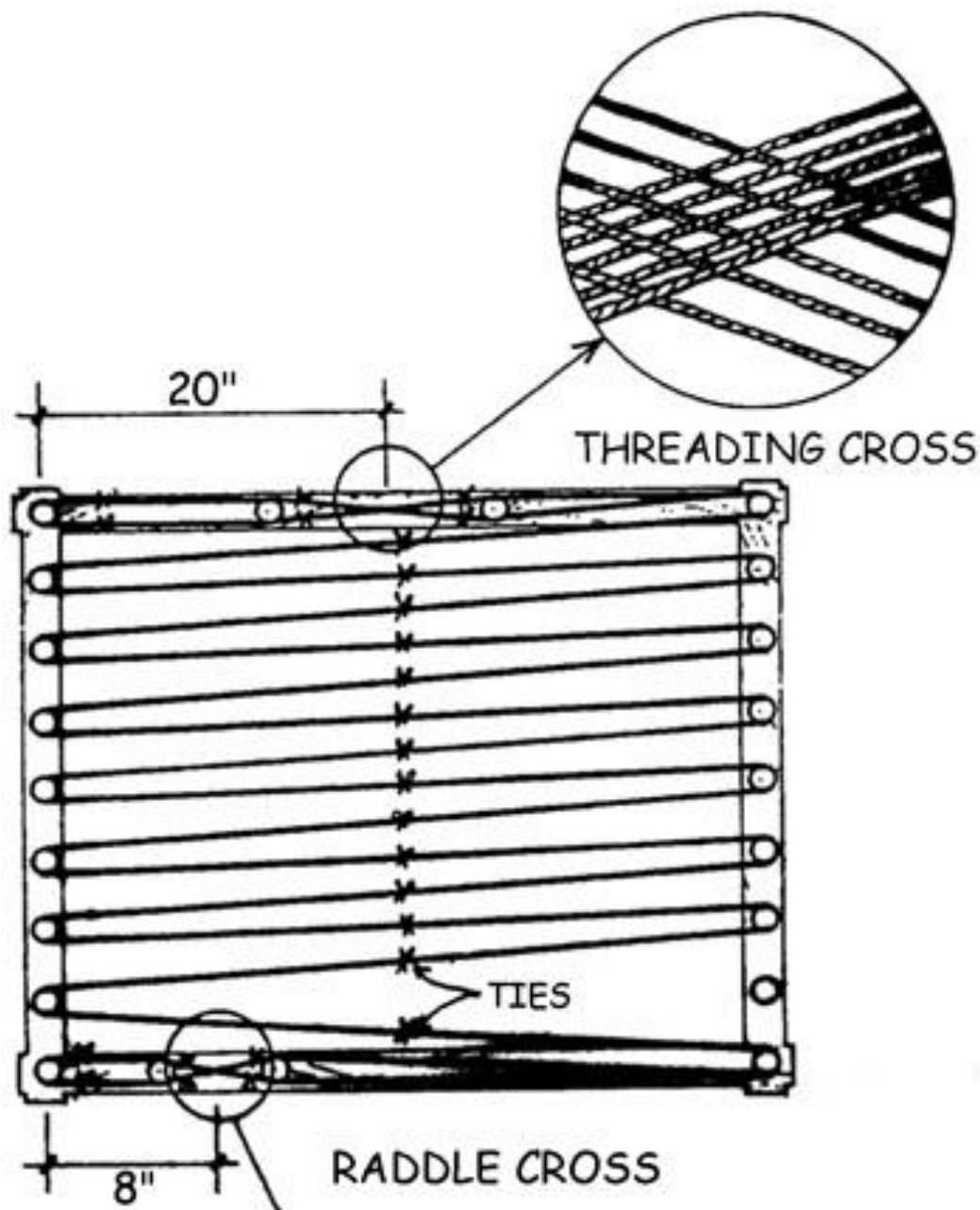
If you only have a Sectional Beam, proceed to the section titled Warping the Sectional Beam.

Various warping methods can be adapted to an AVL loom. However, we recommend the following method in which the warp is wound on to the Plain Beam with the use of a Raddle. Please study this method and try it. We have found that it aids in getting a uniform warp tension, especially when dealing with long warps.

### Creating Two Crosses

To begin, wind the warp on a warping board or reel. Make sure you put in two crosses, one at each end of your warp:

- The Threading Cross (each thread crosses the next thread in opposite directions; all are secured in a single loop).



**Figure 62 - Warping Board with Two Crosses**

- The Raddle Cross (warp threads are tied in groups, depending on how many ends will be put in each section of the raddle).

### Securing The Crosses

Before removing the warp from the board or the reel, secure the crosses. Use four ties to secure each cross, in addition to the tie at the cross axis. These ties go on each side of both pegs holding the cross.

It is usually a good idea to use different color threads for the ties on the tops of the pegs and another color to tie the bows underneath the pegs. By color-coding your ties, you are less likely to twist the warp later.

## **Removing The Warp From The Warping Board**

Remove the warp from the warping board by chaining or by winding on the kitestick. Start from the Threading Cross and proceed to the Raddle Cross.

Since the capacity of the warping board is limited, for wide warps you will end up making a number of mini-warps and taking them off individually.

## **Adjusting The Tension**

Before winding on the warp, check the tension device to make sure the rope is wrapped three times around the tension drum and that the rope end is clipped to the spring, which is held by the Hook Bolt. Test that you are able to turn the Beam in a clockwise direction. If this proves difficult, you can let some length out of the nylon cord by pressing on the toggle button and moving the toggle up and down on the cord. This will allow you to turn the beam backwards during winding and the Beam will be stabilized when at rest. Don't forget to retighten the cord when you are ready to thread the heddles!

## **Attaching The Raddle**

Secure the Raddle to the back of the loom. If you have an AVL Raddle, simply slip the mounting rods into the set of holes in the back of the rear vertical members.

## **Winding The Apron**

### **Note:**

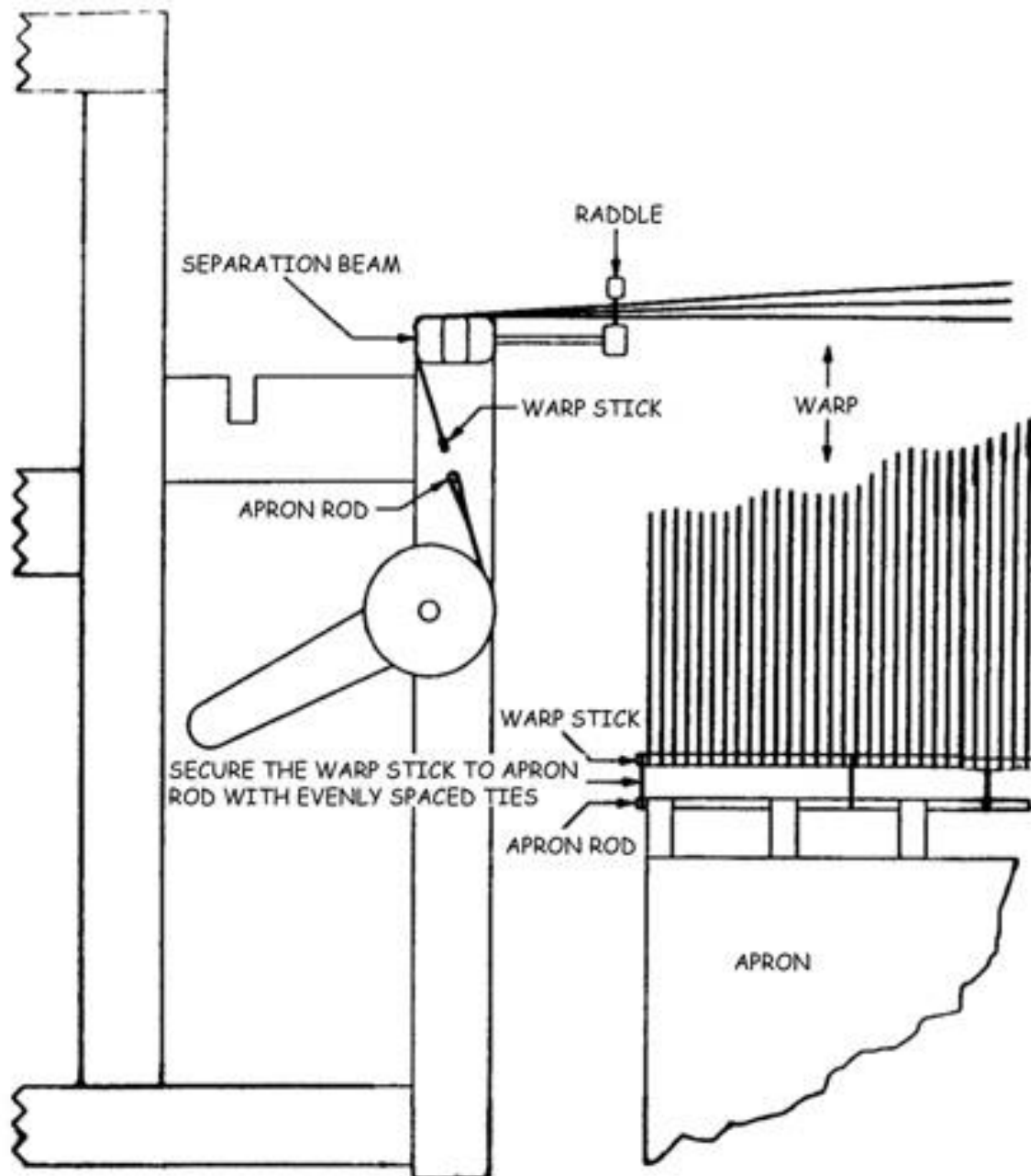
**The top beam of your loom should be placed with the handle at the left side. The bottom beam of your loom should be placed with the handle at the right side. When winding on from the back of the loom, the top beam should be wound counter clockwise, and the bottom beam should be wound clockwise.**

Put your apron on the beam with velcro and wind your beam counter clockwise, so that your apron is wound on the beam.



## Attaching The Warp To The Apron

Bring the apron around the Separation Beam and put the metal rod through the sleeve at the end. You can lash your warp sections onto that rod or you can attach another rod which has been slipped through the loop at the end of the warp with the Raddle Cross.



**Figure 63 - Attaching the Warp to the Apron**

## Inserting Sticks In The Raddle Cross

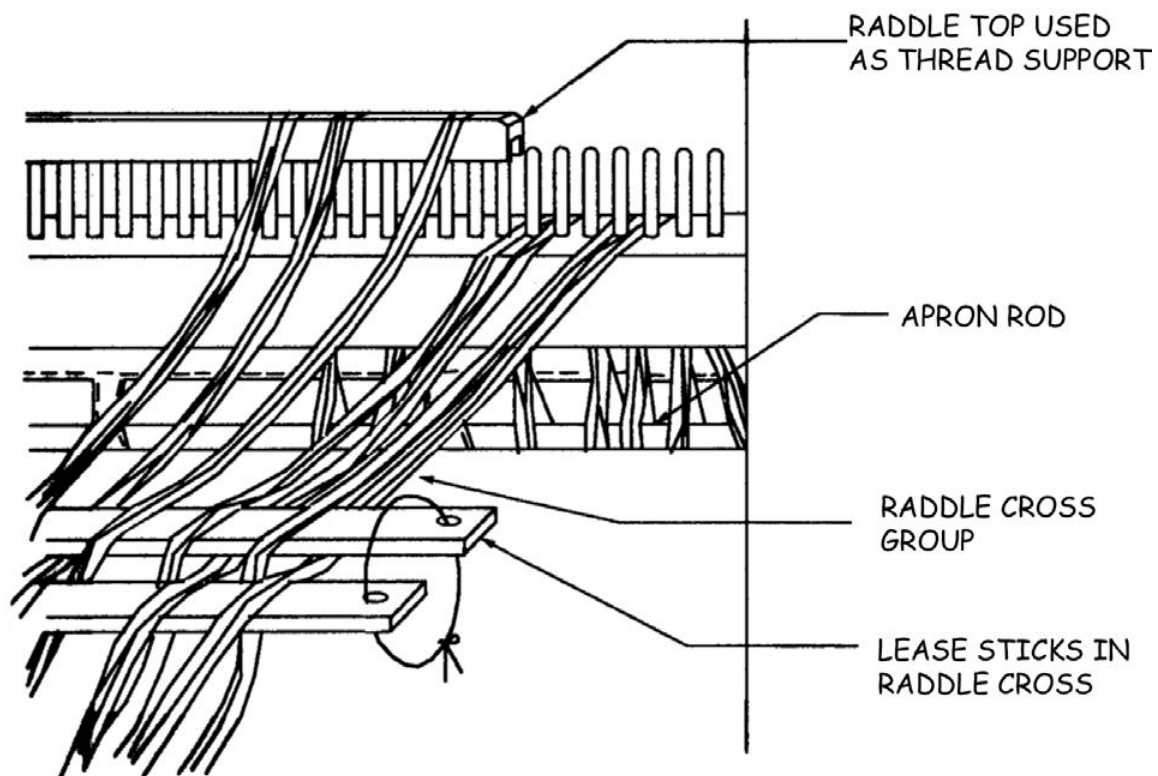
Place two lease sticks in either side of the Raddle Cross and secure together with string through the holes in the ends of the sticks. Now remove the ties from the Raddle Cross and spread the warp out on the sticks.

Measure the center of your Raddle to use it as a center of your warp. The warp threads should either go through the middle of the Raddle or be offset four inches to the right.

## Feeding The Raddle

To feed the Raddle, distribute yarns across the Raddle by dropping each Raddle Cross group into a dent in the Raddle.

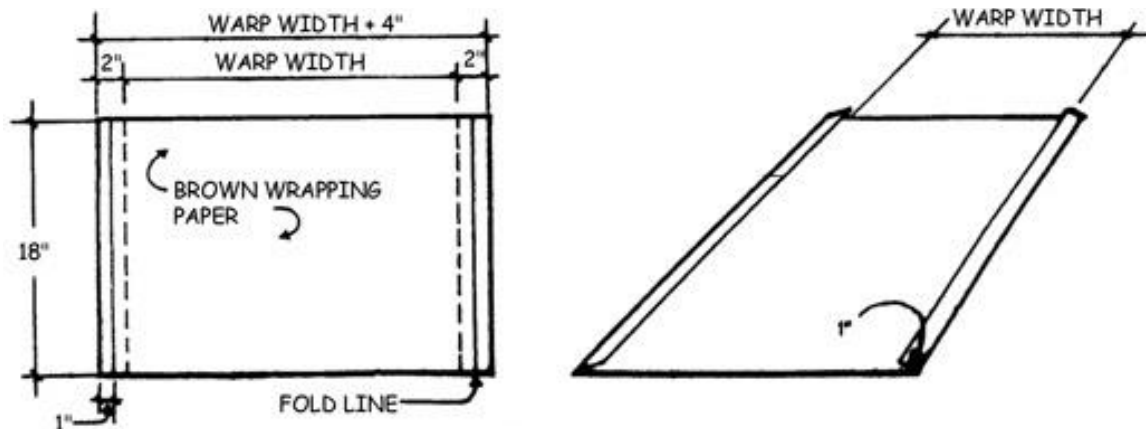
If you are using an AVL Raddle with a sliding cover, slide it on after the Raddle is threaded and secure it with two or three cord ties so it can't come off. Remove the Raddle Cross sticks when this is completed.



**Figure 64 - The Raddle and the Raddle Cross**

## Preparing The Paper

Prepare the paper for winding between the warp layers. For the most professional results, and fewer tension problems, we suggest that the warp be as smooth, tight, and compact as possible. This would mean not using corrugated paper or sticks as they will make the warp too soft and/or lumpy. Corrugated paper is just too soft and the warp can never be wound tight enough with it. Heavy wrapping paper works well; seventy pound craft paper is good. If you are going to be using smooth, slippery warp yarns like fine linens or perle cottons, the edge yarns are going to need extra help in order not to slip off the sides. To do this, cut your paper four inches wider than the warp width and then fold over the edges an inch on each side. Be sure the warp is wound between the two folded edges not overlapping them.



**Figure 65 - Prepared Paper with Folded Edge**

## Winding The Warp

Remember, wind the warp on tightly under a lot of tension. The amount of tension used will vary depending on the warp material, but a good rule to remember is that the tension of the wound-on warp must be as great as the tension during the weaving operation. You will need one person to hold a warp under tension on the back and one person to wind the warp on the beam using a handle. The person winding the warp can also insert the paper. For a wide, heavy warp, several helpers may be required.

If you have to do it yourself, you can use the jerking method. Make one turn around with your beam crank and then go to the back of the loom and jerk one narrow section (2-3 inches in width) at a time to make the newly wound warp tight on the beam. The idea of this method is that the warp does not need to be under tension all the time, but the part that is on the beam has to be tight. Make another turn, go to the back of the loom, and jerk all the

sections again and so on. If you have a wide warp, you might need to do multiple jerking motions after each turn.

## Threading Cross

When you come to the end of your warp, insert lease sticks at either side of your Threading Cross. Tie the two sticks together at each end.

## Removing The Raddle

When the warping is completed, free the warp from the Raddle. If you have an AVL Raddle, first untie the security strings, lift the Raddle top off, and remove the warp from the Raddle. Afterwards, replace the top on the Raddle and leave it in its place on the back of the loom as it will not interfere with the weaving process. Then be sure to bring the end of the warp around the Separation Beam so that it now travels into the loom.

Using a strong cord, suspend the lease sticks between the Separation Beam and the Harnesses.

Now remove the ties from each Threading Cross and spread the warp out on the sticks.

## Using Two Beams

There will be times when you will want to use more than one warp, which cannot be put together on one beam.

You will have to put them on separate beams with separate tension systems.

### When Do You Need To Tension Your Warps Separately?

When weaving:

1. Very different size yarns.
2. Yarns with different stretching qualities.
3. Different densities.
4. Different structures.
5. Supplementary warp techniques (because some warp threads do not interlace as often as others).
6. A group of special yarns for selvages and borders. Loops, piles, or puckers like seersucker.
7. More than one layer with different setts in each layer.
8. More than one layer with a different pick count in each layer.

## Setting Two Beams

The process of setting up a second beam is the same as setting up one beam. You need to be careful not to mix sequences between the beams. It will also take more time to setup two beams rather than one.

- 1) Wind each warp on the beam the same way you would do it if there were only one beam on the loom (plain or sectional). Make a cross and have a pair of lease sticks with a cross in each warp.
- 2) The warp from the upper warp beam goes over the separation beam on the rear verticals. The warp from the lower warp beam goes over the separation beam on the additional bracket.
- 3) Proceed with a threading as if you were only working with one beam. Follow your threading instructions and take special care which thread from which pair of lease sticks comes next.

### **More Than Two Warps, Only One Beam? Separate Tensioning!**

If you do not currently have two beams, or you need more than two separate warps, you can weight and tension your additional warps separately on the same beam. Follow the instructions below.

- 1) Make your warp sections on the warping board and take them off the board in a chain, on a kite stick, or just in a plastic bag.
- 2) Make sure that each bundle is not too thick. You will know when you need to divide each bundle if you feel that all the threads are not being tensioned evenly.
- 3) The weight needs to have a strong loop of string on it so the warp bundles can be slip knotted into it. This makes it easy to undo the slip-knot and move the weight when it climbs up to the back beam and must be let down again.
- 4) The weight also needs to be adjustable. Plastic bottles, with handles, filled with water are perfect. You can also use fishing weights, washers, nuts, bolts. They are not as easily adjustable as water bottles, but take less space. The closer to the floor you can hang them, the less often you need to reposition them.

## WARPING THE SECTIONAL BEAM

The AVL Sectional Beam can be warped in sections with the use of a Tension Box. The yarn travels directly from cones or spools, which are mounted on a rack behind the loom, through the Tension Box, and onto the Beam. Throughout the warping process, the Tension Box automatically keeps a constant and uniform tension on the warp. The Tension Box allows you to make longer warps than other methods.

You can also warp a sectional beam using the AVL Warping Wheel. With the AVL Warping Wheel you wind threads onto the wheel then wind them from the wheel directly onto the beam. When using a warping wheel, your warp length will need to be less than 24 yards.

### Extension Cords

You might want to make a permanent set of Extension Cords to use when warping the Sectional Beam. Extension Cords are also called "apron cords" and serve the same function as the apron on the Plain Beam. They give you "reach" from the Warp Beam and allow you to weave every possible inch until the end of the warp touches the last Harness you are using. Make them out of a strong non-stretchable linen or cotton cord. You will need to make one Extension Cord for each section in your Sectional Beam. For each Extension Cord:

- 1) Measure a piece of cord long enough to reach from the axle of the Warp Beam, at least one and a half revolutions around the Beam and then reach to the back most Harness.
- 2) When measuring the length of the cords, take into account that, when the warp is attached to the Extension Cord the knot between the cord and the warp needs to fall between the Crosspieces of the Sectional Beam, not on them. This will keep the warp smooth on the Beam so it doesn't go over the knots created when attaching the warp to the cords.
- 3) Now double that length and cut it. All Extension Cords should be exactly the same length, so cut them all at the same time.
- 4) Take the two ends of the cord and knot them together, using an overhand knot.



- 5) Wrap the cord around the center bar of the sectional beam with a larks head knot. You will also use a larks head knot to secure the warp threads to the extension cord.

## Using a Tension Box

The Tension Box is an essential tool for Sectional Warping, which:

1. Puts threads under even tension.
2. Spreads threads to the proper width of the section.
3. Makes a thread-by-thread cross.

## Sectional Beam Calculation

First, you must calculate the number of spools or cones of yarn you will need. Each section is wound onto the Sectional Beam separately; therefore, you'll need to have one spool or cone for each end in that section. For example, if your section is 2" wide, with sixteen E.P.I., you would need thirty-two spools or cones of yarn.

To prepare for Sectional Beam warping, we need to calculate:

- **NUMBER OF SPOOLS?**

Sectional Beaming requires the use of as many spools loaded with thread per individual section as your Ends Per Inch, or planned sett in the reed, dictates.

To calculate the actual number of spools required, we need to know:

1. how many EPI (this is the sett) are you going to use in the warp
2. what SIZE of SECTIONS (1" or 2") will you use on the Beam

If your warp is set at 24 epi per 1", you will need 24 spools for a Sectional Beam with 1" sections or 48 spools for a Beam with 2" sections.

## # OF SPOOLS = EPI x SIZE OF THE SECTION

- **NUMBER OF YARDS PER SPOOL?**

To calculate the number of yards per spool, we need to know:

1. the LENGTH OF THE WARP
2. NUMBER OF SECTIONS on the Beam

We calculate the number of sections by dividing the WIDTH OF THE WARP by the SIZE OF THE SECTION. If the warp width is 30" and we are using 2" sections, our number of Sections is 15.

**# OF YARDS PER SPOOL = LENGTH OF THE WARP x # OF SECTIONS**

- **TOTAL YARDAGE?**

If it is a single color warp or if a color sequence is repeating in each section, the same spools or cones can be used to wind all the sections needed for the warp.

**TOTAL YARDAGE = # OF SPOOLS x # OF YARDS PER SPOOL**

It is important to make these calculations in advance so that you can purchase your yarn in spools or cones corresponding to the amount of yardage needed on each. Sometimes this is not possible and you will need to wind your own spools from yarn that is in larger packages. For doing this, you will need empty plastic spools, a bobbin winder (preferably electric), and a yardage counter. These items are available from AVL.

**Feeding The Spool Rack**

Next, place a Spool or Cone Rack about five or six feet behind your loom. Place the spools or cones for the first warp sections on the Cone Rack.

Make sure you put each thread through the metal eye on the spool rack so the threads do not get tangled.

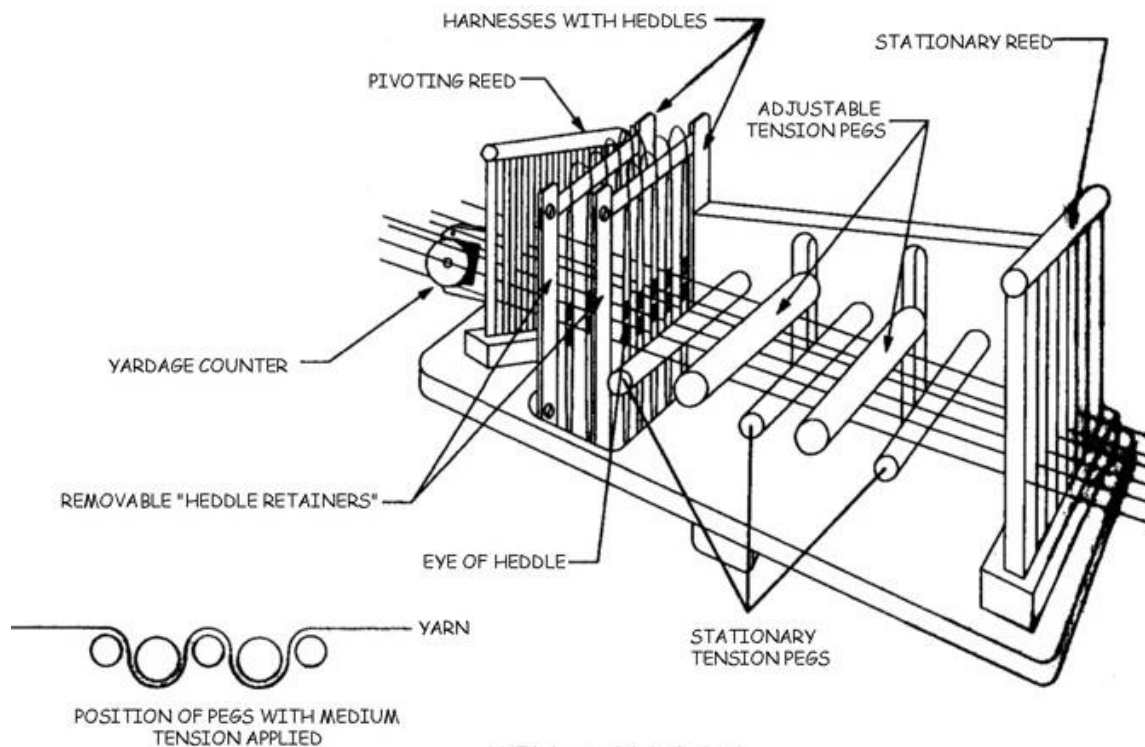
When arranging the spools on the Spool Rack, it doesn't matter whether you go top to bottom or bottom to top, the important thing is to be consistent in vertical columns and to place the spools in the order that the threads are in the warp.

**Tension Box Heddle Installation Instructions**

The first time you use a Tension Box, you need to install heddles on the harnesses of your Tension Box.

Your Tension Box is delivered with one bundle of one hundred heddles. These are held together with twist ties. Leave these on for now. Refer to the following diagram to familiarize yourself with the Tension Box and its parts. Push down on one of the harnesses until it stops. This causes the other harness to go up. You will use that later for making a Threading Cross. Right now we'll need to use it to help put the heddles on the harnesses.

- 1) Remove the "heddle retainer" of the harness that is up, using a phillips head screwdriver.
- 2) Notice there are four twist ties holding the heddles together. Separate the top two. Insert the top bar (of the harness that is up) into the space created by pulling apart the twist ties. Insert the bottom bar (of the harness that is up) into the space created by pulling apart the bottom two twist ties, making certain that the heddles aren't twisted. Now remove the twist ties.
- 3) Count off fifty heddles and cut the loop at the top between the 50th and the 51st heddle.
- 4) Now put the four twist ties back on the fifty heddles that were the last to go on the harness.
- 5) Remove these fifty and reattach the "heddle retainer".
- 6) Now push down on the harness that is up, making the other harness come up.
- 7) Remove the heddle retainer.
- 8) Pull apart the top two twist ties and insert the top of the harness (which is up) into the space created. Pull apart the bottom two twist ties and insert the bottom of the harness into the space created.
- 9) Reattach the heddle retainer.



**Figure 66 - Tension Box**

### Positioning The Tension Box

Mount the Tension Box in the groove of the Track and Mount system, with the Counter facing into the loom. The Tension Box is fastened to the Separation Beam with a small cross piece and wing nuts. This will stabilize the Tension Box and allow it to travel smoothly from one section to another. The wing nuts can be released for the Tension Box to move easily from side to side. Each time the Tension Box is moved and centered properly for a particular section, the wing nuts must be tightened again.

### Threading The Tension Box

The best way to thread the Tension Box is to take one thread from the furthest left cone (as you face the Cone Rack, with your back to the loom) and thread it all the way through all the parts of the Tension Box, nearest to the back plate of the Box, then the next thread all the way through. It works best to use the threads from the rack in a vertical order rather than a horizontal order.

Now let's go through the sequence for threading the Tension Box. First, move the two adjustable Tension Pegs up above the Stationary Pegs or remove them completely. Now, using a sley hook, draw the thread through the Rear (stationary) Reed. Since this reed is eight dents per inch, you will

divide the E.P.I. into eight to find out how many ends will be in each dent (with sixteen E.P.I., put two ends in a section). If your E.P.I. does not divide equally by eight, you can either vary the number of ends in each dent (with twenty E.P.I., alternate two and three ends in the dents) or thread the dents a little wider than two inches (with twenty E.P.I., put two ends in each dent; with forty ends, the reed will be sleyed 2-1/2" wide).

Next, bring the thread straight through the Tension Peg section, between the larger adjustable Tension Pegs and the smaller, stationary Pegs or just above the smaller stationary Pegs if you have removed the larger ones.

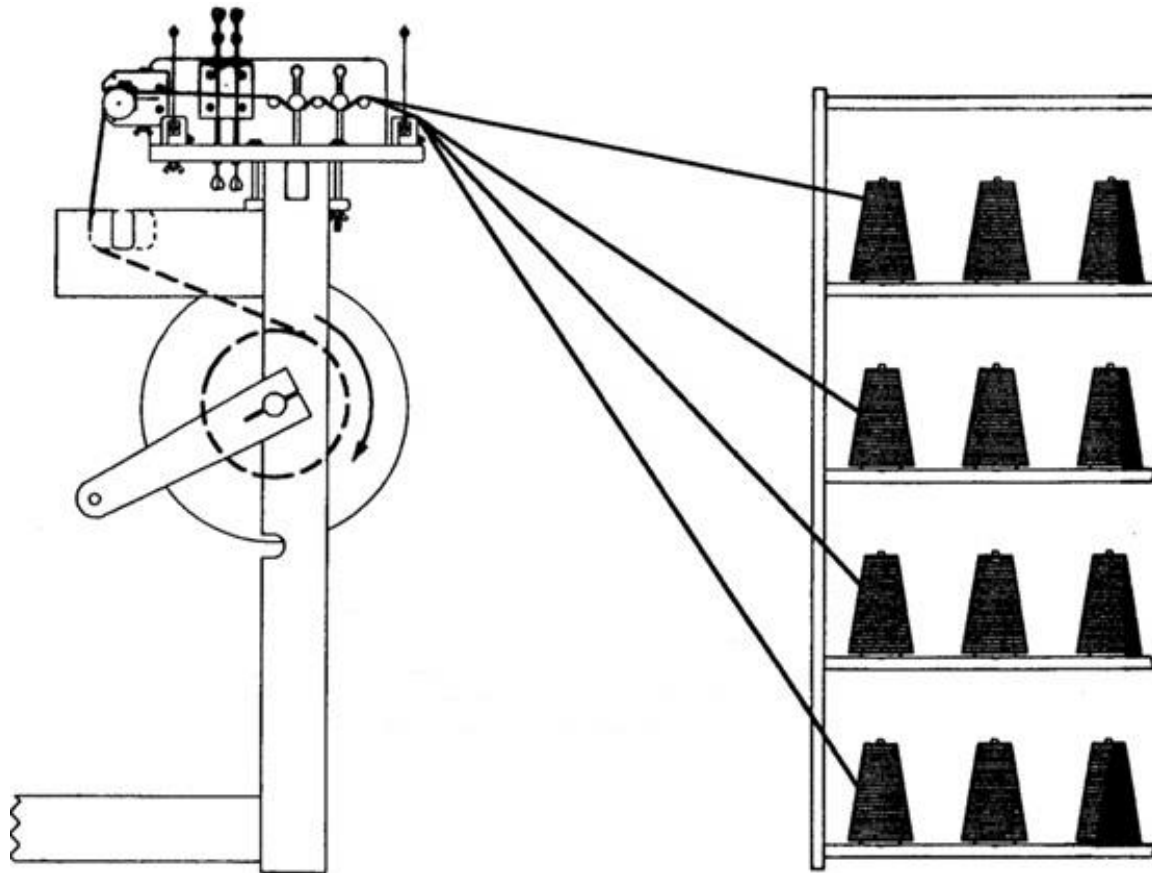
Thread the first end through one heddle on the Front Harnesses, nearest to the back plate. The next end will go through the first heddle on the rear Harness. Repeat this, alternating harnesses for the rest of the ends. The heddle system will be used later to create the Threading Cross.

Now thread the end through the front Pivoting Reed. Here you have a choice of using an eight dent or ten dent reed. Pick the one that can be sleyed evenly and as close to the desired section width as possible. If you cannot get the exact width of the section, sley your reed slightly wider. This will make it just slightly wider than the space between the hoops. The section will be narrowed down by pivoting the Reed. Never sley the reed narrower than the section on the Beam because it is critical that the ends wind on evenly across the width of each section. If the ends are set too narrow at the Pivoting Reed, there is no way to expand it.

After the Tension Box is completely threaded, move the larger Pegs downward and tighten their wing nuts securely, to apply tension to the yarns. The further down the Pegs are moved, the more tension will be applied to the yarn. This is an adjustable system as different yarns require more or less tension. With a heavy wool, the Pegs may only need to be moved half-way down, whereas with a fine silk, the Pegs may need to be moved all the way down and the yarn wrapped an extra time around one of the stationary Pegs to get the proper tension. Once you have adjusted the tension correctly, do not change it during the winding of the Beam, as long as you are using the same type of yarn.

Once the Tension Box has been threaded, it is not always necessary to rethread it. If you need to change spools or cones, simply tie the new ends on to the old ends just before the rear stationary reed and pull gently on the old ends until the new ends have come all the way through the box.

## Winding The Warp



**Figure 67 - Winding on the Warp**

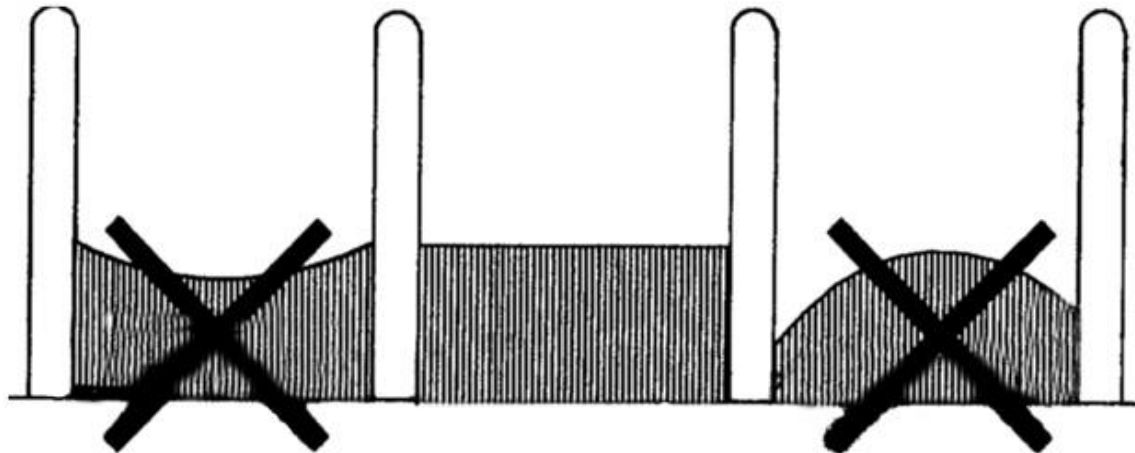
Tie an overhand knot near the end of the warp threads from one section and slip that knot into the opening of the larkshead knot you create in the Extension Cord. Pull it tight.

Line up the Tension Box to the section you will be winding.

### Adjusting The Size Of The Section

Now, slowly wind about one revolution onto the Beam. As you wind, you will need to fine-tune the placement of the Tension Box along the track. When it is centered properly, tighten down the wing nuts under the Tension Box. At this point, you can pivot the "pivoting reed section" so that the yarn comes close to, but doesn't quite touch, either the hoop to the left or the hoop to the right. Now tighten the wing nut under the pivoting reed. This shouldn't need to be readjusted unless you are using a different yarn size in another section.





**Figure 68 - Adjusting the Size of the Section**

Extra care to correctly center and adjust the width of each warp section will result in more perfect tension while weaving.

Make sure that the threads are going on to the Beam in flat layers. If you notice that warp piles up at the hoops, the section of the warp is too wide. If the warp falls down at the hoops, the warp section is too narrow.

If any of the above is happening, gently unwind the warp (into a box, perhaps) and pivot the front reed on the Tension Box again until you get perfectly flat layers. This is very important, otherwise you will end up having different length threads in one section, since the circumference of the Beam within the section is not going to grow evenly. This uneven tension will cause tension problems.

### Counting Turns Or Yardage

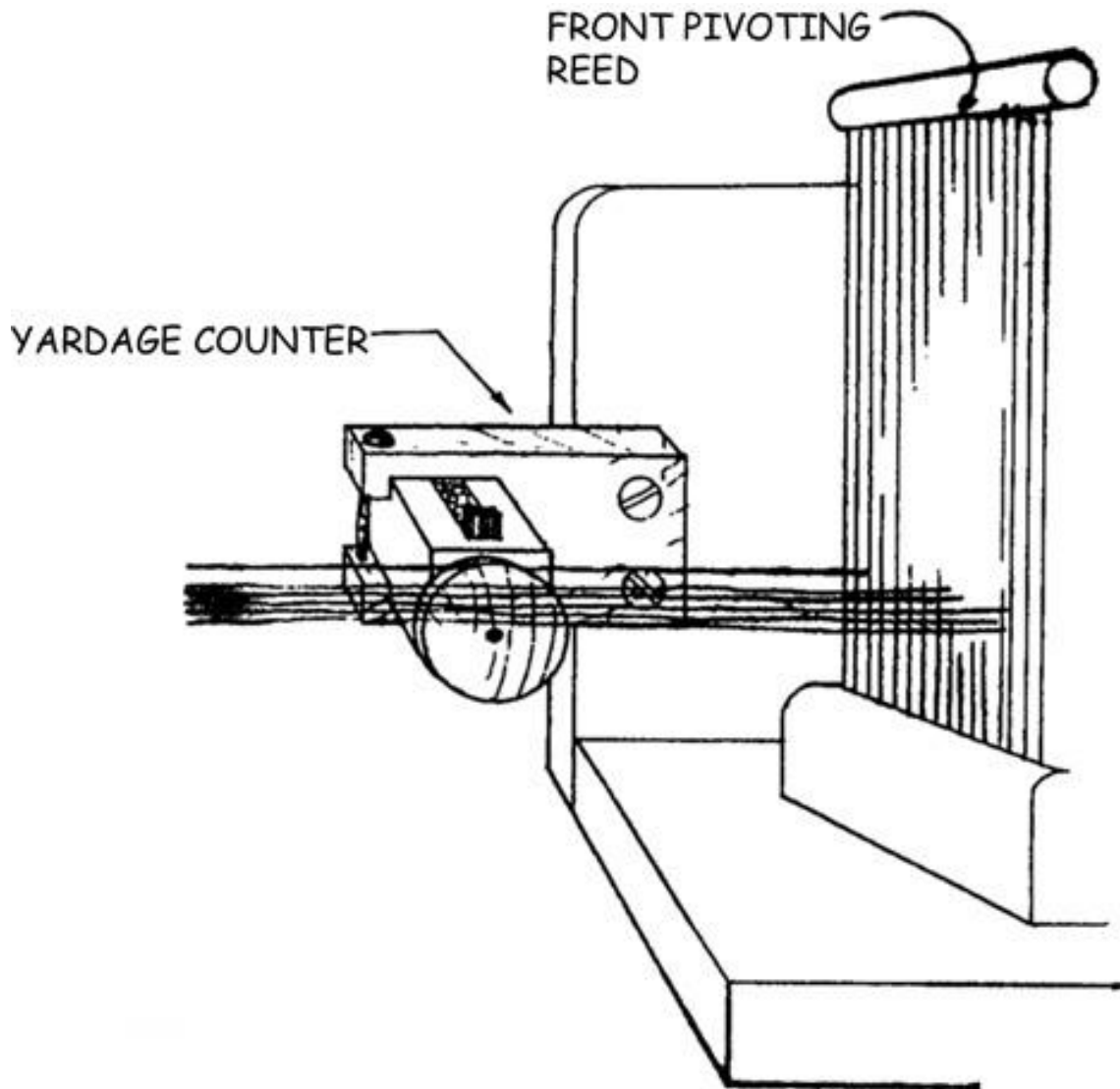
To determine the length of the warp you are putting on the Beam, you need to count either turns, revolutions, or yards.

To count turns, you can do it in your head, but it is more reliable to use a digital or mechanical revolution counter.

Counting revolutions even with a digital counter will only give the approximate warp length, because the circumference of the Beam will increase slightly with each rotation. This is called "Beam Build Up".

To count yards with a Yardage Counter while warping the Sectional Beam, you need to place the Yardage Counter at the front of the Tension Box. You should use an extra thread for measuring yardage, because if you use one of the threads from your warp section, that particular thread would have a

different tension once you start weaving. The extra thread you use for measuring purposes can then be reused for each section.



**Figure 69 - Attaching Yardage Counter to Tension Box**

**Creating The Cross**

When there is about a half-yard left to be wound onto the Beam, it is time to make the Threading Cross. Simply push on the rear Heddle Frame of the Tension Box, making half of the threads go up and the other half go down.

Now slip in an 8" piece of contrasting thread through the opening (called a Shed) created between the threads above and the threads below. Position

this Marking Thread about halfway between the Tension Box and the Separation Beam.

Now push down on the front Heddle Frame, making the other half of the threads go up. You may need to give a gentle tug to the section, behind the Box, to help the threads separate into the new Shed. Now take one end of your Marking Thread and bring it through this Shed. The two ends of the Marking Thread should now be together. Tying them in a bowknot, you have just made the Cross. Continue to wind the first section on, until the Cross is nearly on the Beam. Cut the ends, and secure to the section using a piece of masking tape.

Continue winding all the sections in the same manner by moving the Tension Box along its track.

Remove the Tension Box from its track in the Back Beam and flip the Beam over.

Replace the Separation Beam into its former position atop the front verticals, with the groove facing down, to serve you as the Breast Beam.

### **Inserting Sticks In The Threading Cross**

When all the winding is complete, remove the tape, unwind a few feet of warp from each section, and slip one lease stick through the path created at one side of each Marking Tie. Now slip another lease stick through the path created by the other side of each Marking Tie. Secure the lease sticks together, leaving about two inches between them, using masking tape or string through the end holes of the lease sticks. Now bring the lease sticks, with the warp ends, around the outside of the loom and over the Back Beam, so that warp travels towards the center of the loom (harnesses).

### **Readjusting The Tension**

Now tie the lease sticks on the side of the loom so that they are at eye level when you are in your threading position.

To keep the warp from slipping forward during the threading process, retighten the tension rope around the pulley and tension drum and clip the rope end to the spring.

## **Use of Warping Wheel**

### **The Setup**

- 1) Adjust height so position of mini-raddle is just below eye level.

- 2) Adjust the wind-off tension with toggle and cord. Tie cord to prevent slipping.

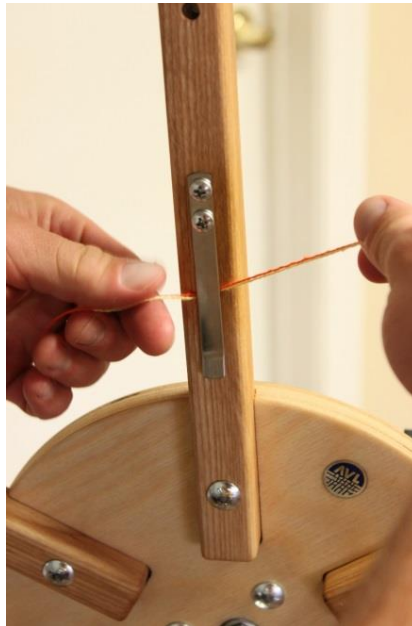


**Figure 70 - Adjust Wind-off Tension**

- 3) Adjust Warp Length using different spool placement by moving the spools on the arms.
- 4) Reset the Revolution Counter to Zero
- 5) Setup Cones with the Cone Caddy

#### **Making the First Section**

- 6) Open and secure the raddle top using the removable pin.
- 7) Slide the thread(s) under the metal catch clip, tails facing to the left. Tails should be about 5 inches long.



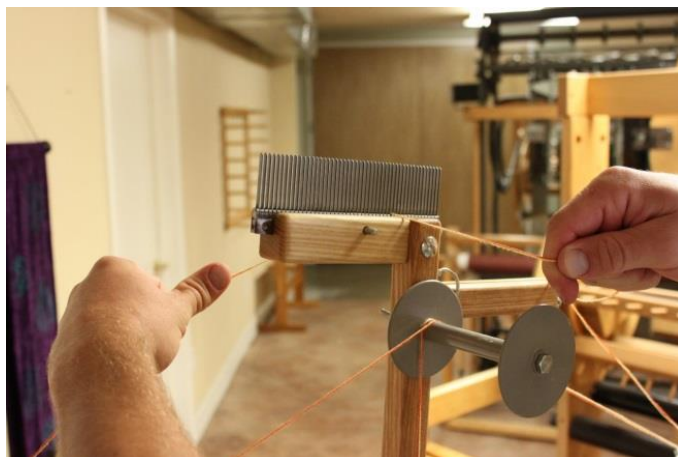
**Figure 71 - Catch Thread Ends**

- 8) Bring the thread(s) up and over the left side of the top spool so that you are ready to wind the Warping Wheel in a counter clockwise motion.



**Figure 72 - Wind Counter Clockwise**

- 9) After you have wound one length bring the thread(s) around the back of the raddle and through a dent (working from right to left).



**Figure 73 - Bring Thread Through Riddle**

- 10) Bring thread(s) down over the end you just wound and secure in the silver clip (swooping under from left to right).
- 11) Wind as many lengths as needed for the section.

#### Tying Off

- 12) Put the riddle top back on. Cut the bout threads just to the left of the clip and under the threads going over the wheel.
- 13) Hold onto the threads securely at the riddle (so they don't slip through). Below, wrap the cut threads around the clip.



**Figure 74 - Hold Threads at Riddle**



- 14) With the raddle top secure, remove the pin from the raddle holder while holding onto the threads.



**Figure 75 - Remove Raddle from Top Position**

- 15) Bring the raddle down to the winding-on position and secure with the pin. Tie a knot in the thread past the raddle so it won't slip through.



**Figure 76 - Place Raddle in Lower Position**

- 16) Take the extension cord from your beam. Create a larks head loop at its end and loop it around the knotted end of your warp section.



**Figure 77 - Place Extension Cord Around Thread Bundle**

- 17) Before the last part of the threads pass through the raddle, tape the threads on the loom-side of the raddle in their sequence using masking tape. This will help you keep the threads in order when you thread the harness.
- 18) As you wind on, pivot the raddle to adjust the width of the section to fit exactly in-between the pegs on your sectional beam.



**Figure 78 - Pivot Raddle**

## COMBINING SECTIONAL AND PLAIN WARPING

Depending on your equipment and preferences, you may prefer to wind separate warp sections on a warping board or reel and go from there directly to the Sectional Beam. If you decide to do this, however, your warp will be limited in length by what will fit on the warping board or reel. If you choose this method, follow these steps:

- 1) Calculate the number of threads for each section on your Sectional Beam.

- 2) On the Warping Board or reel, make "baby warps" for each section on your Beam.
- 3) Make crosses at each end: raddle cross on one side and thread-by-thread cross on the other.
- 4) Take the warp off the board or reel by taking off the thread-by-thread cross first.
- 5) Put the warp threads from a first "baby" warp in the Raddle, making sure that threads are spread evenly and that they are creating flat layers when wound on the Beam. Put the raddle top on or secure warp threads with rubber bands.
- 6) Instead of a regular raddle, you can put a mini-raddle in place of the front reed on the Tension Box. In this case, the Tension Box is used only for guiding threads into the sections. It is not necessary to sley threads in the Tension Box, either through the harnesses or through the back reed, and you do not need to adjust tension with the Pegs.
- 7) Attach each baby warp to the Extension Cords and proceed as in regular Sectional Beaming procedure.
- 8) Since you are not using the Tension Box for tension, be sure to keep it taut manually.
- 9) When you come close to the end of the section, take the reed cover off and continue winding the rest of the baby warp.
- 10) Secure that section to the Beam and continue to the next one.

If you wish to use the Tension Box to maintain tension on your warp during the Wind-On phase, it will be necessary to make a Cross at both ends of your warp. If you can make your warp slightly longer, you can use the extra length to leave in your Tension Box for the purpose of tying on the subsequent sections.

## **THREADING, SLEYING, & TYING ON**

### **Preparation For Threading**

To prepare for threading, tie the threading cross-sticks in a comfortable and visible position between the Back Beam and the harnesses.

The important thing in threading is your comfort. Take the time to position everything so that your body feels at ease while threading.

## **Threading The Harnesses**

Now we're ready to thread the loom. If you are right handed, it is recommended to start at the right side of the warp. Grasp one group of ends in your left hand and your sley hook in your right hand. Direct the "hook end" of the sley hook through the "eye" of the first heddle you need to thread. Pull the thread through.

For example, if you had a straight draft on eight harnesses, your first thread would go through the eye of a heddle on the 8th harness. The second thread would be threaded through the eye of the first heddle on the 7th harness, the third thread through the first on the 6th harness, and so on.

Some weavers mark the center heddle on each harness and thread from center, out to each side. This allows for leaving an equal number of heddles at both sides of the harnesses, when threading is completed.

## **Unused Heddles**

After threading is complete, make sure that the unused heddles are all pushed to the far sides of the harness sticks between the screweyes and the ends of the harness sticks. For balance, there should be approximately equal numbered groups of unused heddles on both sides of each harness.

## **Sleying The Reed**

Now sley the warp ends through the reed. Some weavers start from the right side; some from the left; some in the middle. But, in all cases, be sure to measure accurately before starting so that the warp will be centered in the reed (or offset four inches to the right if the warp on the beam is already offset). Use the way you prefer to position and stabilize the reed between the harnesses and the Breast Beam for ease during the sleying process.

## **Tying On To The Apron**

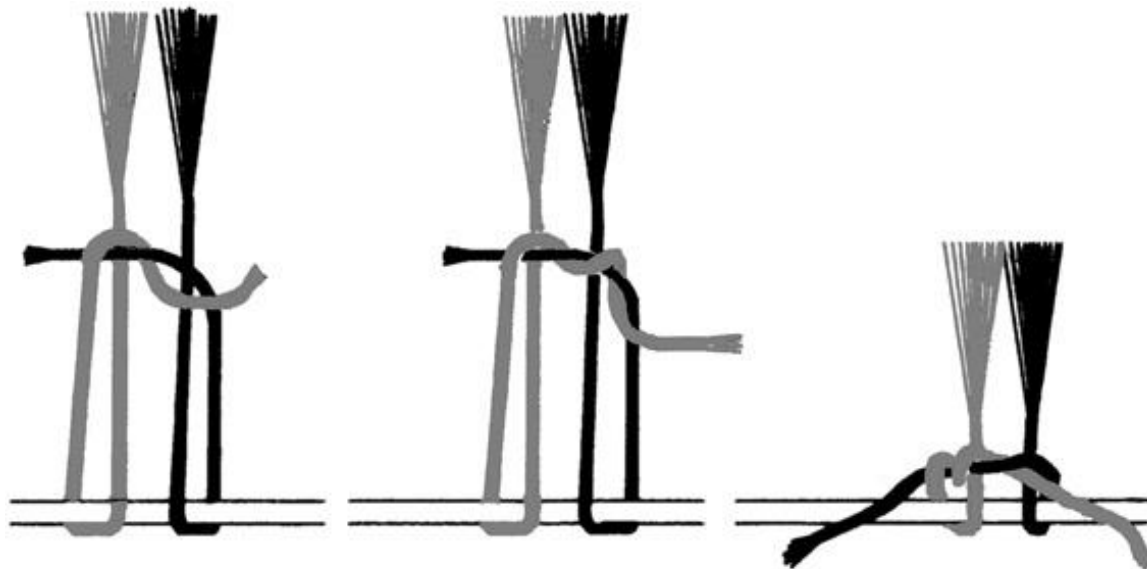
Now that you have your warp ends ready to tie, we need to prepare the apron. The ends will be tied to the apron rod.

Notice that the apron has two hemmed ends. One end has loops on it and the other end has a velcro strip. The Cloth Storage Beam also has a velcro strip. Measure to find the center of the Beam and, using tape, mark the

center above the velcro strip. Find the center on the apron, at the end with the velcro and fold it in half, with the velcro doubled on itself and facing out. Match center of your fold to the center of the Beam velcro, with the apron length hanging to the floor. Press the velcro strips together firmly, while pulling gently toward each side of the beam, making sure it is centered.

Now you can remove the tape marker and, turning the top of the Beam away from you, wind so the apron is wrapped once around, holding itself in place. Route the apron underneath the Cloth Beam and, towards the harnesses. Spread it out flat and center it over the Cloth Beam and insert the metal rod into the loops at the hem.

Now tie the ends to the metal rod. Starting from the middle, bring a first bundle toward you over the apron rod, then around and under it. Divide it in half and bring one half up on each side of the bundle. Use the ends to tie a surgeon's knot. It is the same as the first tie you make tying a shoelace, except you loop the end through twice. This kind of knot is very good for hold and readjusting the tension.



Start with one section in the middle, then the far right and the far left outside ones. Work your way in. After tying the knot, pull only until you feel some resistance and tighten the knot and proceed to the next section.

By now, the sections that were tied first maybe quite a bit looser than the ones tied last. To correct this, you do not need to untie the knots, simply grasp the ends and pull them away from you, then re-tighten the knots, remembering to only pull until you feel, what is now, a uniform resistance at each group. Repeat this until all of the sections are at approximately the

same tension. It is important to remember at this point, that you are not trying to achieve weaving tension, only uniform tension across the width of your warp. Attaining weaving tension is what the Cloth Beam Ratchet is for!

As directed in the preceding warping instructions, you'll secure the front of your warp to the Cloth Storage Beam via the apron. Use the handle at the right of the Beam to advance the warp and raise the tension. Simply release Warp Beam tension by depressing the Brake Pedal(s) as described above, push the handle forward to engage in the toothed ratchet, and rotate it down. It will wrap the warp onto the beam and draw the fell away from the Beater. The Pawl is that finger device that engages in the ratchet. Its job is to keep the Beam from rolling backwards and it must be engaged to hold the tension.

### **Tying On To An Old Warp**

A new warp can be tied on to an old warp, thus eliminating the threading and sleying process, if the new warp introduced into the loom uses the same threading pattern and E.P.I. as the last warp. This process is especially good for production weavers as it saves time. It also takes less concentration and there is less chance of making mistakes in threading.

The tying on process starts when you are finishing the last warp on the loom. Before you cut off the fabric from the old warp, make sure to leave enough unwoven warp to extend one foot behind the harnesses, through the heddles, and about six inches past the reed when the beater is in its rear position. Now open two opposite tabby sheds and insert the lease sticks into these sheds behind the harnesses. Secure the sticks together with tie tapes through the holes.

Now carefully cut the fabric from the loom and tie bundles of warp coming through the reed together with a half-knot so the yarn can't slip back through the reed. Cut the warp in back (leaving one foot past the lease sticks) and also use a half-knot to tie bundles of yarn together for security.

After winding on the new warp on the Beam, you can sit behind the loom, on a small stool and tie corresponding yarns from the two sets of lease sticks together. An overhand or weaver's knot work well. This may seem slow at first, but you will work up a faster rhythm with some practice. A good goal to reach would be to tie 200 to 250 ends together an hour.

When all ends are tied together, go to the front of the loom and gently pull on the bundles of yarn going through the reed to pull the new warp through the heddles and reed. You may find that turning small bundles of the warp in



a circular, clockwise motion will help them through the heddles and reed. Then tie on to the apron.

## ADVANCING THE WARP

To advance the warp, you will need to remove tension from the warp and use the cloth storage beam crank to move the fabric onto the cloth storage beam.

- 1) Turn off the warp beam brake. If you are using two warp beams, make sure to turn off the brakes for both beams.



- 2) Crank the cloth storage beam handle until you have advanced the warp far enough.

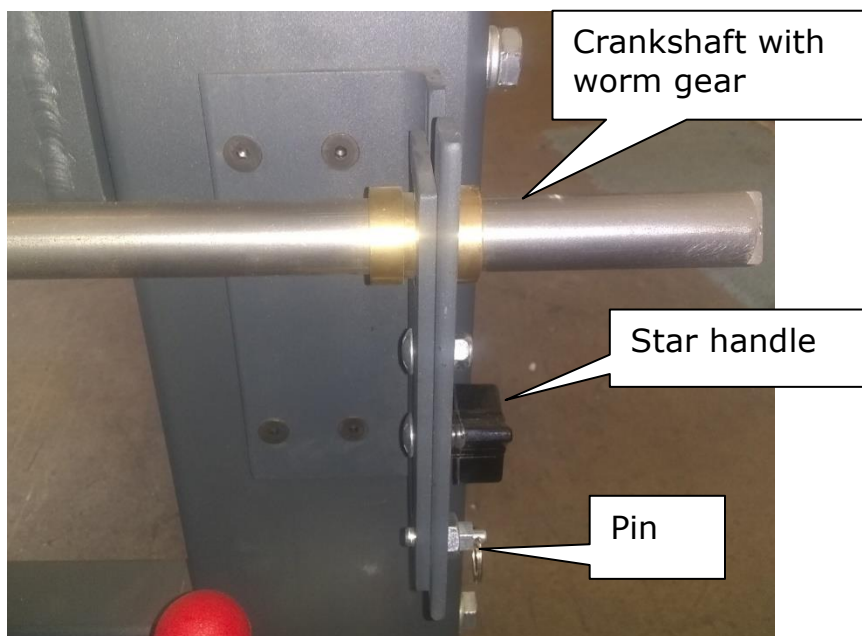


- 3) Turn the warp beam brake back on. If you are using two warp beams, make sure to turn on both brakes.

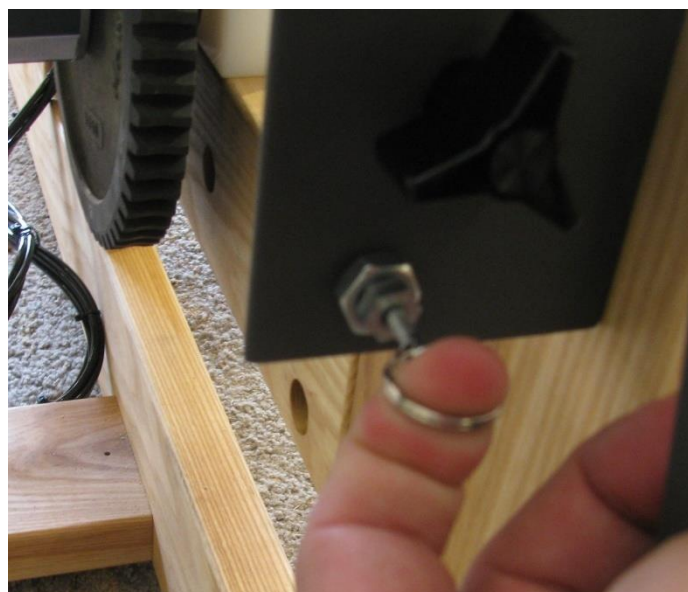
## REMOVING CLOTH FROM THE LOOM

To remove the cloth from the loom you will need to release the worm gear from the cloth storage beam so that the cloth can be freely removed.

- 1) Loosen the star handle.



- 2) Pull the pin so that the slide plate can move up.



- 3) Move the crankshaft up so that the worm gear is released from the cloth storage beam.



- 4) Tighten the star handle so that the crankshaft stays in place.



# THE FINE PRINT

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Your warranty covers:

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New Accessories, Loom Upgrade Parts, and Replacement Parts: Subject to the limitation contained in subsection (i) under the section entitled "What is Excluded?" below, AVL warrants to the original purchaser of any accessory, loom upgrade parts, or loom replacement parts (the "Additional Part") that are sold by AVL that such Additional Part will be free from defects in materials and workmanship for ninety (90) days from the date of purchase. In the event that any Additional Part is physically damaged or physically defective and if such defective Additional Part is returned to AVL within ninety (90) days of the date of purchase, AVL will provide a replacement Additional Part at no charge. The sole remedy for this warranty shall be limited to the replacement of the defective Additional Part. You are responsible for all shipping charges (including applicable taxes) incurred with returning the defective Additional Part.

All New Products and their components (including replacement Product and its components) are covered only for the Original Warranty Period. When the warranty on the original Product expires, the warranty on any replacement Product, or components also expires. After two (2) years from the Effective Date, you pay for any replacement or repair, including all parts, all labor and shipping charges (including applicable taxes).



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- 1.Labor charges for installation or set-up of the Product, as well as any labor charges required to install, disassemble, troubleshoot, or reassemble the Product.
- 2.Any taxes imposed on AVL for Product replacement or repair under this warranty.
- 3.Installation, performance of, or repair of: cabling, electrical, or accessory attachments used with the Product.
- 4.Product replacement or repair because of misuse, accident, repair by any party other than AVL, or other cause not within the control of AVL. Please note that removing any parts from the Product for any reason voids the warranty.
- 5.Incidental or consequential damages resulting from the Product.
- 6.A Product that has been modified or adapted to enable it to operate in any country other than the United States or any repair of Products damaged by these modifications.
- 7.Electrical and pneumatic components, each of which carries a one (1) year warranty from the Effective Date.
- 8.Jacquard components function beyond 98%. A Jacquard module is considered to be operating within specification if 98% of all hooks are operating as commanded.
- 9.Computing equipment, such as a Personal Digital Assistant or a Personal Computer, which are manufactured by a third party(ies) and which may be under warranty through the original manufacturer. AVL is not responsible for any warranty coverage that may be offered concerning these products and you must contact those manufacturers directly regarding any available warranty coverage.

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