

**AHRENS & VIOLETTE  
LOOMS**

# **Weaving Instructions**

# Introduction

In many ways the Ahrens & Violette looms are an innovation in the weaving field. Jim Ahrens, a mechanical engineer with over forty years of professional weaving experience, designed the looms. His search for a loom that would function more efficiently than the present looms available led him into years of research into many old and, in many cases, forgotten loom designs and weaving techniques. He studied all the ancient looms and especially the looms of the guild masters of Europe. Much of this information he found in old and out-of-print books. He also has operated, and has an intimate knowledge of power looms. He refined what he considered to be the best and most workable features of all these looms - the features most suited to reducing time and effort from the weaving procedure and maximizing professional results. He created the Ahrens & Violette looms with their many unique features.

Learning to warp and weave on an Ahrens & Violette Loom will mean learning some new procedures and techniques even for the experienced weaver. Since the looms will not function to their capacity unless care is taken to dress and operate them properly; it is greatly worth the while to study the following instructions in detail. The time taken to really make these procedures your own will result in increasing your weaving speed and efficiency. This leads to a greater enjoyment of the entire weaving experience.

16 HARNESS DOBBY LOOM

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# Winding On The Warp

The Ahrens & Violette looms are designed to be wound on from the back with use of a raddle. This speeds up the dressing of the loom by eliminating some of the cutting and knotting usually required. A stick in the end of the warp fits into a groove in the warp beam. This creates a smooth surface for the warp to be wound onto and gives a more even tension.

1) First wind the warp on a warping board or reel. Make sure you put in two crosses, the threading cross, about 18" in from the first peg, and a raddle cross, about 10" in from the last peg. A proper raddle cross is essential for easy and quick threading of the raddle. To make the raddle cross you first determine the number of ends to be placed in each section of the raddle. Then wind that number of threads in the same direction for each part of the cross. That way you won't have to count off ends when threading the raddle; instead you'll be able to drop one group of threads into each section of the raddle.

The number of ends to be placed in each section of the raddle will vary according to the number of ends per inch in the weaving and the number of divisions per inch in your raddle. Sometimes this will be merely a matter of division, and equal groups will result in all the raddle sections. For example, with 12 EPI and a 4 dent raddle, put 3 ends in each section. Other times you may have to fool with it more and have different number of ends in each raddle section. For example, with 15 EPI and a 4 dent raddle, use the sequence 3, 4, 4, 4 in the sections. A still more satisfactory

possibility is to thread the raddle a few inches wider than the warp will be sleyed. For 15 EPI and a 4 dent raddle, thread the raddle at 12 EPI or 3 in a section. As long as the warp is no more than 2 or 3 inches wider on either side of the raddle then it will be sleyed in the reed, this actually creates an ideal angle for the selvage threads traveling across the loom as they won't be bent by the draw-in at the web of the fabric. NEVER thread the raddle thinner than the warp will be sleyed or the selvage threads will be very bent and poor tension will result.

2) Now secure both crosses and make TIGHT choke ties. Do NOT cut the end loops; instead secure them firmly with two or three ties so that the loops can not fall apart. This will save you time later. Then remove the warp from the warping board by chaining (or better still using a drum or other device for keeping the warp taut) from the treading cross to the raddle cross.

3) Place two thin 3/16" lease sticks in the raddle cross and secure together with string through the holes in the ends of the sticks. Then place one of the fatter 7/16" warp sticks in the end of the loop of the warp closest to the raddle cross. If you secured the loop properly this only takes a second, otherwise you have a mess. Take a long piece of string and run it across the warp stick, through the holes in both ends, around the other side and tie it together, forming a security cord so the loops can not slide off. Now remove the original ties from the end loop and raddle cross.

4) Working at a table, distribute yarns through the raddle. Make sure the warp is centered and secure. If you are using a sliding raddle cover, secure it with 2 or 3 cord ties so it can't come off.

Now remove the raddle cross sticks when this is completed.

- 5) Before winding on the warp, there are a few small things to take care of on the loom. First release the tension device by unsnapping the rope from the spring, and unwrapping it from around the warp beam drum. Also make sure the stop pin is in its place in the rear cloth take-up drum so it won't unroll. Check the cloth take-up weight. Turn the cloth take-up handle until the weight is in its top most position.
- 6) Now secure the raddle to the back of the loom. If you have an Ahrens & Violette raddle, simply slip it into one of the set of holes in the warp beam bracket (the lower hole of the top set of three holes seems to work best). If you are using some other raddle you will need two 1/4" pieces of doweling six inches long. Insert these into the same holes and then tie your raddle to these.
- 7) The brackets that hold the warp beam have been designed so that the warp beam and raddle can be adjusted in different height positions. In the normal weaving position the inner sliding bracket blocks are in their upper most position with the lock pin in the top hole of the upper set of three holes in the warp beam bracket. It is important that these lock pins pass all the way through the sliding bracket blocks and seat into the side frame.

When a very long or thick warp is wound onto the warp beam so that the angle of the warp going through the loom will be excessive and, or, it will interfere with the raddle, the warp beam and raddle are moved down to a lower position. If after some of the weaving is done the angle lessens, the warp beam should be raised.

When winding on, the warp threads should go through the middle of the raddle. If they rub or push on the top or bottom of the raddle, move the raddle to a different position.

8) Making sure the loops are distributed evenly along the warp stick, place the stick into the groove in the warp beam. If an unusually thick warp is used, apply pressure or even a hammer if necessary. Secure the stick in the groove by binding on either side of the warp with string.

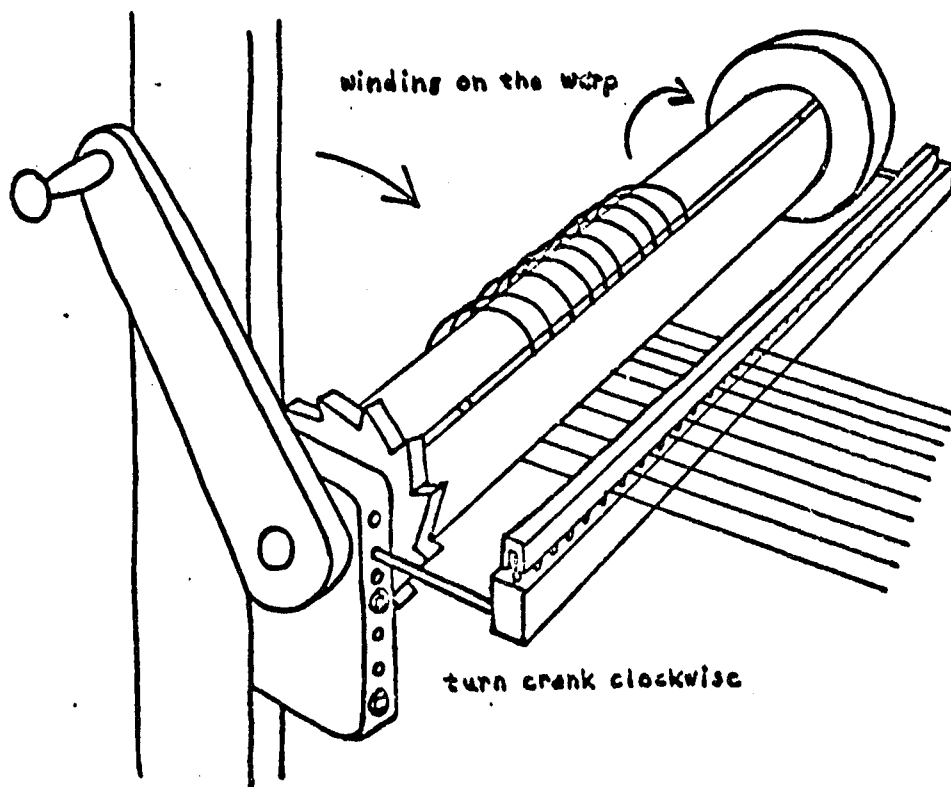
9) Next prepare paper for winding between warp layers. A heavy wrapping paper is desirable, 70lb. Kraft paper is good; never use corrugated paper or sticks as they will make the wound on warp too fat and/or lumpy. Corrugated paper is just too soft and the warp can never be wound tight enough with it. Remember, if the warp is wound on tightly and smoothly you will have few if any tension problems and will end up with professional results. It is not necessary to add to the bulk of the wound on warp by winding paper throughout, as a tightly wound warp also eliminates any cutting of one layer of warp into another. Cut several lengths of paper, each about 18" long, enough to have one about every yard and a half of the warp. The width of the paper is usually cut 2 or 3 inches wider than the warp; but to be safe cut the paper 6" wider. With a tightly wound warp, the paper's only purpose is to support the edge yarns so they will not fall off themselves. For sticky warp yarns flat paper will be fine. For smooth warp yarns make sure to fold the edges of the paper over about an inch on each side.

10) Start winding the warp on from the back. Turn the crank in a clockwise direction, so that the warp comes in from the bottom.



I will say it again because it is so important - wind the warp on TIGHTLY under a lot of tension. This will vary with each warp material, but a good rule to remember is that the tension of the wound on warp must be greater than that put on it during the weaving operation. For a wide heavy warp several helpers can be required. If the choke ties are very tight, and enough tension is applied to the warp, combing should be unnecessary.

Watch the edge yarns, and wind in a layer of paper when they have built up to the point when they will no longer support themselves. This will be at least one layer every 1 1/2 or 2 yards, if not more. Be sure the warp is wound between the two folded edges, but not overlapping them.



11) When the warp is unchained, put a square warp stick through the loop in the end and put in the two thin lease sticks in the threading cross. Tie all sticks so they can't fall out and put a heavier stick through the loop to pull on. Then remove all the ties and spread the warp out. This technique is used especially with wide warps to eliminate the acute angle which is formed as the end of the warp comes close to the warp beam. With thin warps it is not necessary. Continue winding until the threading cross will just reach the rear of the harnesses.

12) For those who ordered the second plain beam, it is wound in exactly the same manner as the first warp beam. Place the raddle in the holes provided in the second warp beam supports. Remove the crank from the first warp beam and place it on the second beam for winding. After the second plain beam is wound, don't forget to bring the warp under the dividing rod before threading.

13) For those who ordered the sectional beam, please refer to the section WINDING THE SECTIONAL BEAM which is in the back.

# Threading, Sleying, And Tying On

The beater and front cloth beam are easily removed, so that the weaver can sit on a low stool placed in front of the built-in bench for easy and comfortable threading; sleying is done sitting back up on the bench. A set of extension cords and warp sticks are used to create a front bar to tie on to. The cords, sticks, and knots are removed early in the weaving process, thus eliminating weaving over a lumpy and knotted surface which disturbs tension.

1) To prepare for threading, lift out the beater and front cloth beam. To free the cloth beam, unscrew the upper left bolt in the cloth beam support (use a small wrench which you keep just for this purpose) and remove the top half of the block. Be sure to unfasten the chains from the bottom of the lower harness sticks so that the heddles will move easily.

2) With Lengths of string, tie the threading cross sticks up to the rear of the castle, so that the cross is even with the eyes of the heddles.

3) Unloosen the bottom square nut on the side of the built-in bench and tilt it to a vertical position so you can use it as a back rest. Then place a small stool on the floor in front of the bench to be sat on for threading. The stool should be just the right size so that the heddle eyes are at just your eye level or a little higher. They should never be lower, or you will have a difficult time threading. For taller people, it may be necessary to raise the harnesses. To accomplish this, first make sure nothing is pegged in on the dobbie unit so that the lever can be pulled down without raising any harnesses. Secure the lever

in this downward position with heavy cord. On the bottom of the dobbie unit are 16 cord ends corresponding to the 16 harnesses. In turn pull each cord end downward, while reaching into the dobbie box and placing the knot on each cord into its notch in the lever, thus raising the harnesses. Make sure to lower the harnesses again before tying on.

To assure that the warp beam will not roll forward while threading, set the rope around the tension device (see diagram under SETTING THE TENSION DEVICE).

4) After the heddles are threaded, remove the stool and tilt the built-in bench back to a comfortable sitting position, fastening it in place by tightening the nut. Replace the beater, and secure it in a middle position using binding cords. The top of the beater is then removed and the reed slanted forward providing an excellent position for sleying. Other sleying positions are possible depending on what works best for you. After sleying is completed attach the chains to the bottom eyelets of the harnesses and replace the front warp beam making sure the ratchet and ratchet handle are in the correct position.

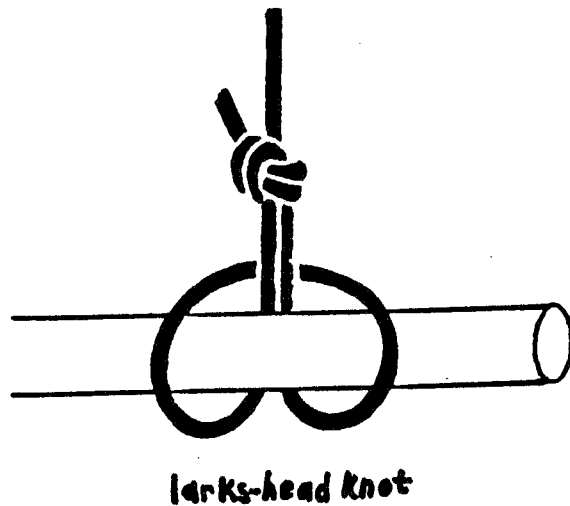
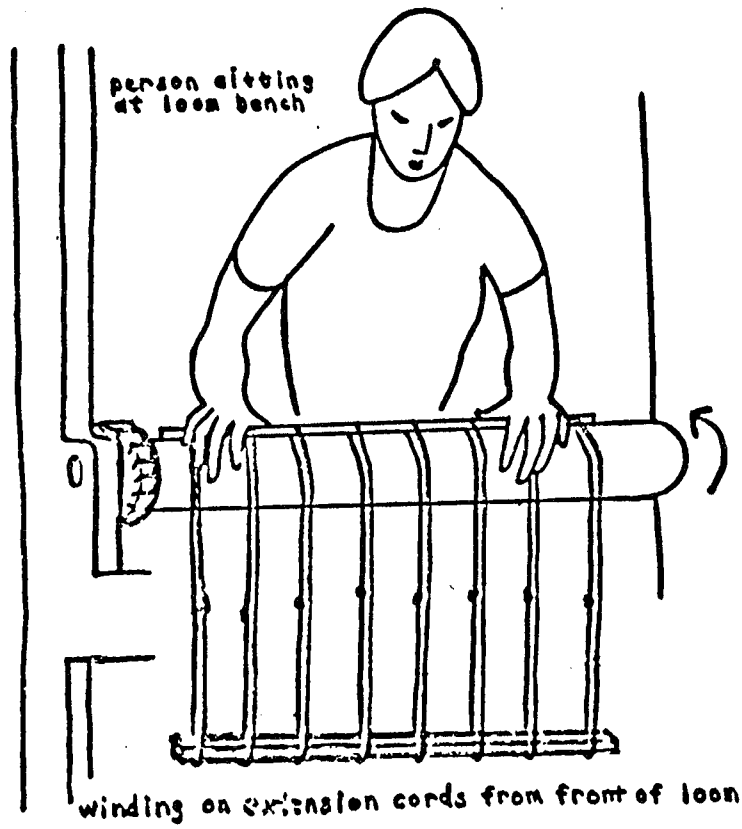
5) A permanent set of extension cords must be made for the loom. Make these of strong cord (linen is good, cotton will work) cut 2 yards long, which are knotted at one end to make a one yard closed loop. Make enough to be able to space them at 3" intervals along the entire length of the cloth beam. The cords should be tied around pegs on a warping board on nails in a board, and care should be taken in making the knots, so that they are all EXACTLY the same size.

6) The first step in creating your temporary front apron bar is to place two of the square warp sticks through the ends of a number of the extension cords, one stick at either end, so that the extension cords are spaced at 3" intervals in the centers of the warp sticks, covering the width of the warp only. Using more extension cords than would cover the width of the warp will cause the warp sticks to bow excessively after the warp is tied on. The knots on the extension cords should not be at the ends where the sticks are placed.

One simple way of accomplishing this, is to hold the two warp sticks together and slip the extension cords over both of them at once, placing the cords at three inch intervals as above; then holding one warp stick horizontal, lower the other one to the bottom of the loops. Another method for doing this which may be preferable because it prevents the cords from sliding around on the sticks, is to lay two warp sticks on the floor parallel to each other and a yard apart, then use larks-head knots to attach the ends of the extension cords first to one stick, then the other at three inch intervals as above.

7) Now place one of the warp sticks with cords on the front beam, making sure it is centered and parallel to the roller. Check again to make sure the extension cords are covering the width of the warp only. Holding the stick in place, rotate the beam toward the front so that the extension cords are wound onto the cloth beam. After one turn the stick does not need to be held in place. Apply tension to the second warp stick and continue winding until the second warp stick can be extended over the top of the beam to 6" from the beater in its rearward position.

- 8) Use paper or cloth to cover up the unused ends of the beam, as its surface is abrasive to skin and clothes.
- 9) The warp is now tied on to the second warp stick in the conventional manner. Since the tension device is not set yet, tie the yarns on evenly and tautly, but you need not pull them very tight.



# Setting The Tension Device

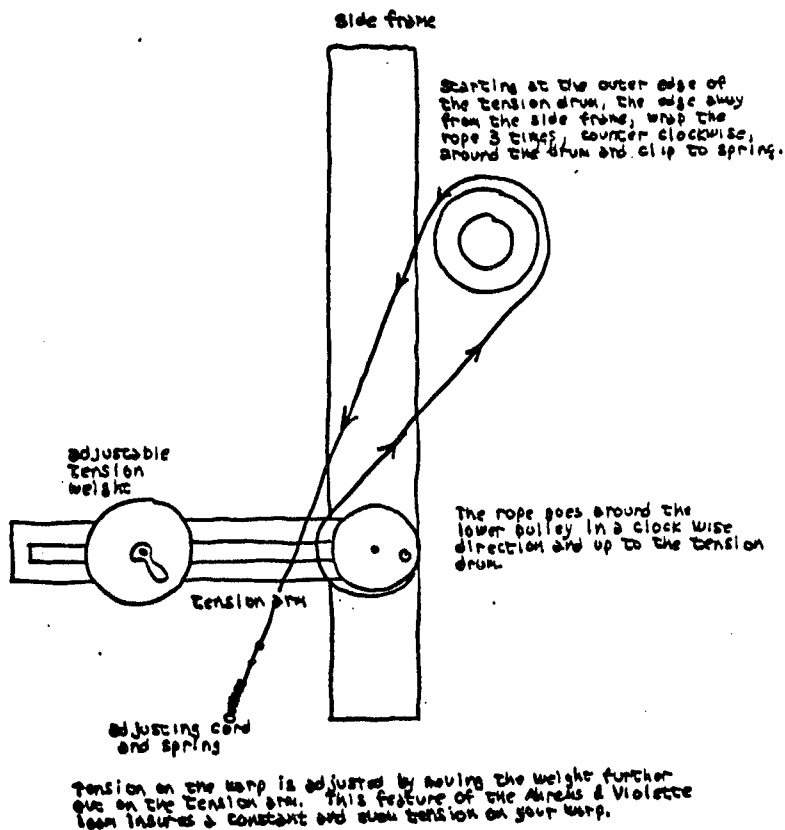
Warp tension is controlled by a special weighted tension arm which insures a constant tension at all times. The tension is easily adjusted, and the warp beam is released automatically as the cloth is advanced.

- 1) Prepare the tension device by replacing the rope around the tension drum and clipping the rope end to the spring. Be sure to check with the diagram to make sure you are getting this right until you have done it several times. The rope should make three turns around the drum and must start from the correct position. Always check again to make sure the rope has not been crossed.
- 2) To set the warp tension, first move the weight to its rear-most position (next to the wooden pulley). Wind the warp forward slowly, using the front ratchet handle. Continue winding until the weighted lever rises and stops when the rope slips on the brake drum.
- 3) The lever should stop approximately in a horizontal position. If it rises above horizontal, let the adjusting cord out at the spring. If it stops below horizontal, shorten the cord. The adjusting cord has been tied with a slip knot and can be adjusted without untying the knot. On a new loom the brake rope may have to be shortened occasionally to bring the weighted arm up to the horizontal position until the rope is stretched out.
- 4) Now feel the warp for tension. If the warp is too loose, set the weight further out on the on the arm. Wind the warp forward a little and re-check. You will find that you can weave

with less warp tension with a weight control than with the conventional ratchet system. Once the correct tension adjustment is made, it will be maintained automatically as the weaving is advanced.

5) In making these adjustments at times the warp will be wound too far forward. To wind it back on the warp beam, release the front tension, lift the tension arm, and turn the back roller (the crank may be needed). Always check to see that the rope has not become crossed. Then wind the warp forward again with the front ratchet handle until the lever rises to horizontal.

#### WARP TENSION TIE-UP





# Pegging The Dobby Unit

The dobbie unit is basically a mechanical programming system where the weaving pattern is "pegged in" on a chain of wooden bars at the side of the loom. Then by simply operating the loom's two treadles, the harnesses are lifted in the sequence determined by the pegging in the dobbie unit.

1) The first thing to do is to make a plan of the harness lift sequence for the weaving pattern you will be using, in order to determine the number of dobbie bars to be used. Each dobbie bar has sixteen holes corresponding to the sixteen harness; and at each pick as the treadles are operated, each bar moves into the dobbie box in turn, and harnesses are raised corresponding to where you have placed pegs in the holes. As you can see, this differs from a tie-up, as every lift in the sequence must be pegged on a bar. To illustrate this, let us take a simple four harness twill. To do various four harness twill weaves on a regular treadle loom the following harnesses are tied up to four treadles: 12, 23, 34, and 41. Then different twill patterns are created by the order in which your feet operate the treadles. On the dobbie loom, however, the specific twill lift sequence must be pegged on the bars. One such twill would be pegged as follows: bar 1 - peg holes 1 and 2, bar 2 - 23, bar 3 - 34, bar 4 - 41, bar 5 - 12, bar 6 - 41, bar 7 - 34, bar 8 - 23, bar 1 - 12.

Here are some other points to keep in mind while making your

plan of how the bars are to be pegged. At least eight dobbie bars must be used at once in order for the dobbie unit to function properly; so that if the number of lift sequences is small it should be repeated several times. For example, for a tabby weave which has only two lift sequences, repeat the sequence four or more times. Remember that when the chain is placed in the dobbie unit it will form a continuous circle, and that the direction that the chain moves can be reversed at any point. If the same lift sequence is to be repeated over and over, it is pegged continuously on the bars. If two or more different lift sequences are to be used, you might want to plan on putting one or two blank bars in between the different sequences to help mark place. Another possibility when a lift sequence is to be reversed to create a mirror image, is to plan on pegging in the pattern once and reversing the direction the chain moves in order to get the mirror image. This saves pegging time and dobbie chain.

2) Now lay a chain of dobbie bars of the proper predetermined length flat on a table with the larger surfaces face up. To take off bars from the chain, unfasten the metal connecting loops with a screwdriver. To add bars to the chain use a long nosed plier to reconnect the metal loops; or if desired the bars can be fastened together with string, in which case make sure the string is strong and wound around twice with two strong knots.

3) The 16 holes in the dobbie bars correspond to harnesses one through sixteen from left to right. In order to save trouble later, it is a good idea to mark the left end of the top bar "front" since it will be placed toward the front of the loom when placed in the dobbie unit.

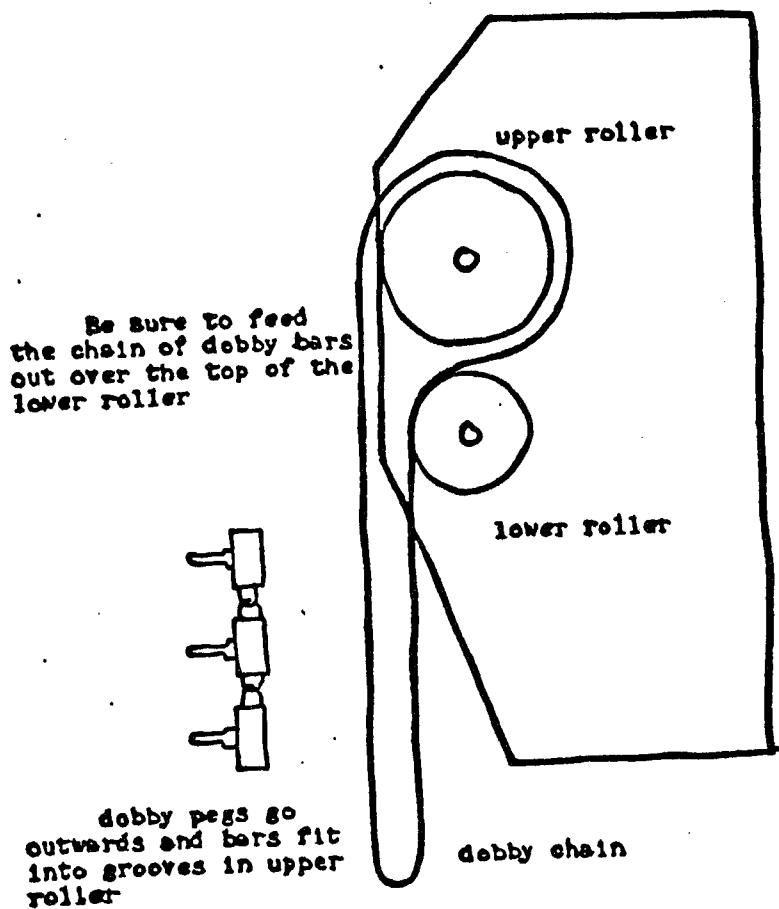
Starting from the topmost bar and working downward, a metal peg is placed in the holes where a harness is to be raised according to the harness lift plan. For example, for a tabby weave place pegs in holes 1, 3, 5, 7, 9, 11, 13, and 15 in the first bar, and in holes 2, 4, 6, 8, 10, 12, 14, and 16 in the bar below it, etc.. To place the metal pegs in the holes, use the special wrench provided. First place the smooth end of a peg in the wrench. Then holding the wrench handle, screw the peg into its hole firmly but not too tightly. Use the wrench again when removing pegs.

4) Now the completed "pegged-in" chain is placed in the dobbie unit. Making sure the holes corresponding to harness one are on the left, place the top of the chain in the grooves in the top roller of the dobbie box. Making sure the forward-reverse cord is in its most extended position with the knot caught on the outside of the wooden stop bracket, rotate the roller toward the top of the loom so that the chain moves over the top of the roller and into the dobbie box. Place your fingers in the box under the top roller and guide the chain so that it comes out over the top of the smaller roller which is underneath. This is very important because the dobbie chain will jam in the box if it does not come out over the top of the smaller roller. When enough chain is available, fasten the chain together to form a continuous circle using string. The string should form a loop exactly like the metal connecting loops in size and form. Make sure the string is strong and wind it around two times making a tight square knot after each turn.

5) When pegging up the dobbie head, one thing that you should remember is that if over 60 to 90 dobbie bars are used, the weight of this

chain of bars may cause the dobby head to skip a bar as it is advanced. If you are using a long length of dobby chain and you experience this skipping, you'll need to support some of the weight of the bars.

### DOBBY HEAD



# Adjusting The Beater And Spring Levers

In preparation for the weaving procedure, the Ahrens & Violette beater is adjusted in height as well as horizontal position. Also there is an adjustment which can be made on the spring levers to decrease or increase the amount of force applied to hold the harnesses in their bottom position depending on the weight of the warp.

1) The beater can now be adjusted in two ways. First place the beater in one of its three horizontal positions depending on your personal preference and/or how hard the fabric will be beaten. For a very heavy beat, the beater can be placed in its rearmost position. For a very light beat it can be placed in its frontmost position. Then adjust the height of the beater by using the adjusting wing nut screws near the bottom of the beater legs, so that the bottom half of the shed is just touching the shuttle race in the open shed position. This provides a smooth surface for throwing the shuttle.

2) For those who ordered the flyshuttle beater, it is adjusted in the same way as the plain beater above. For complete instructions please refer to instructions near the back entitled USING THE FLYSHUTTLE BEATER.

3) The springs of the spring lever return system should be adjusted so that there is a positive harness return, i.e. the harnesses are staying all the way down in the depressed position, with the least amount of effort needed to raise the harness. In general lightweight, less dense, looser tensioned warps with a

smaller weaving width will need very little spring tension to assure positive harness return; whereas heavier, denser, tighter tensioned, wider warps will need more spring tension. To tell if the harnesses are returning all the way, open several sheds by working the treadles (see No. 1 under WEAVING PROCEDURES). Watch the unlifted harnesses and if the tops of their heddles become loose and tend to move around then spring tension should be increased, but just enough to get the harnesses to stay down and no more or your treadling effort will be made greater than it has to be.

4) To adjust the spring tension, simply unhook the spring and then rehook it one chain link shorter. This tightens the spring and makes it pull down harder on that particular harness. Test the warp again by doing some more treadling and if more spring tension is still needed, try one on more chain link less. With a mediumly tight thick warp it may be necessary to remove the chain links and use only the spring. Under unusual conditions (perhaps a very tight rug warp) two springs on some or all of the harnesses may be necessary. The important thing to remember is that the system is designed so that it can be "fine tuned" for each particular warp, so experiment with it. The loom comes with 16 chains and 16" screen door springs. If extra springs are needed they can be purchased in almost any hardware store; you can also get extra chain there.

# Weaving Procedures

With everything adjusted properly, weaving is an easy and light procedure, as the two treadles are worked to lift the harnesses and the weaving is advanced rapidly in 2" intervals. At the onset of weaving special measures are taken to remove the extension cords creating an even tension in the weaving; and a similar process is used whenever it is desired to remove part of the weaving from the loom before the warp is completely woven off.

- 1) The left treadle advances the bars in the dobbie unit and the right treadles raise the harnesses. For each weft pick, press downward first on the left treadle, then on the right treadle in rapid succession. Be sure the left treadle goes all the way down so as to allow the next dobbie bar to advance completely.
- 2) The position of the forward-reverse cord determines the direction in which the dobbie chain will move. To make the chain move in one direction pull the forward-reverse cord outward and catch its knot on the outside of the hole in the wooden stop bracket. To reverse the direction in which the chain moves, gently pull and snap the cord so that the knot goes through the hole and rests on the other side of the stop. Be careful not to pull the cord too hard, or you will pull the spring out of shape.
- 3) To advance the cloth you simply wind it forward by using the ratchet handle while the beater is in its forward position. Make sure the fell of the cloth does not go beyond the end of the beater in order not to have to wind it backwards (see number 6 of SETTING THE TENSION DEVICE if this does occur). This easy, rapid method

of advancing the cloth makes it practical to wind the cloth up about every two inches of weaving. By maintaining this two inch weaving space the swing of the beater and the shed angle are kept more nearly constant, and this makes it much easier to weave a uniform fabric.

4) At the onset of weaving, first weave in 1" of a strong medium weight weft with a tabby weave. Then weave in two thin lease sticks on alternate sheds, followed by another 1/2" of tabby weave. Cloth strips are unnecessary, as the two woven-in lease sticks will even out the warp for you. Proceed with the weaving until the woven-in lease sticks have wound around the roller about 1 1/4 times, in other words, until the woven cloth overlaps the lease sticks on the roller.

5) Now release the ratchet on the cloth beam and unwind the weaving back to the beginning. Unwind the cloth, extension cords, and both warp sticks from the front roll. Then remove the extension cords and both warp sticks by cutting off the knots which tied the warp to the second warp stick. Do NOT cut off the tabby hem and woven-in lease sticks from the end of the warp.

6) Place the two thin woven-in lease sticks flat on the front cloth beam making sure they are centered and parallel to the roller. Wind the weaving back on the cloth beam holding the lease sticks in place until the weaving is wound back over itself and holds itself in place.

7) Take up the tension by using the ratchet handle until the weighted tension lever rises to the horizontal position and continue weaving.

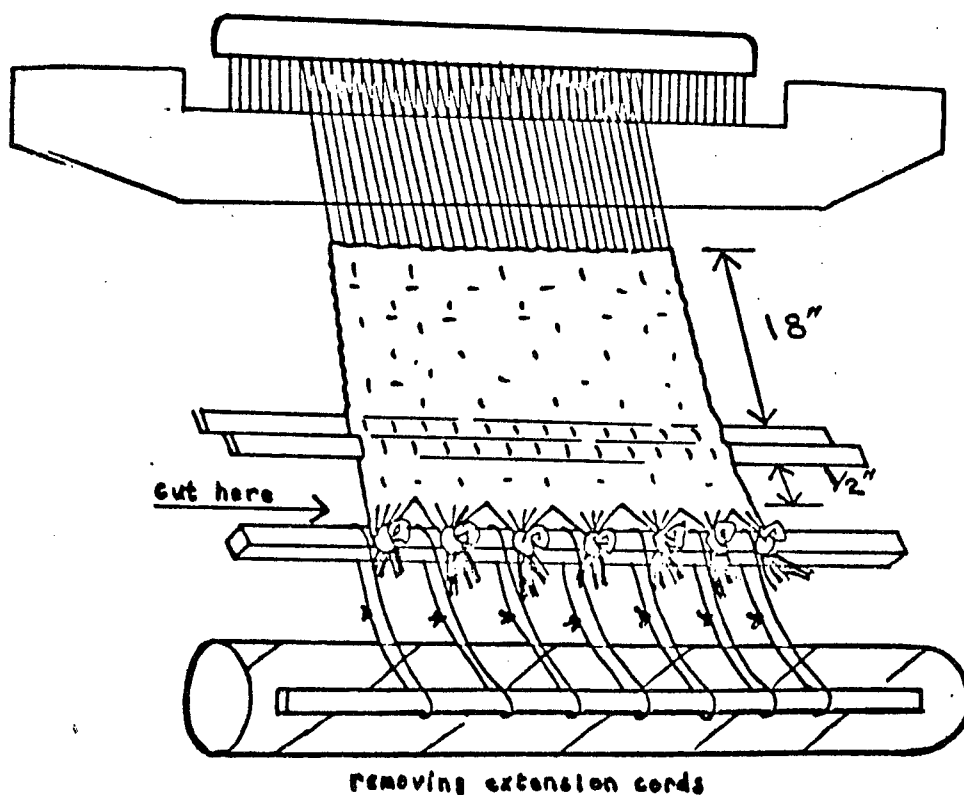
8) If you want to remove part of the weaving from the loom before



the warp is woven off, use the following procedure:

1. When the piece to be removed is finished, weave one inch of tabby.
2. Weave in two lease sticks followed by 1/2" of tabby as in 4 above.
3. Start new weaving.
4. Weave until the lease sticks are wound 1 1/4 times around the front cloth beam (or about 18" if weaving is being taken off rear roller).
5. Unwind and cut off the piece to be removed just below the tabby hem and woven-in lease sticks as above.
6. Follow steps 6 and 7 above.

This system takes very little time, there is practically no waste, and a uniform warp tension is maintained.



# Using The Rear Cloth Take-Up Roller

When weaving long lengths of fabric, the material is taken around the front cloth beam and passed to the back of the loom to the rear cloth take-up roller, which can accommodate a roll up to 16" in diameter. The rear cloth take-up system, consisting of rope, pulleys, and a weight, is designed to automatically wind the rear roller. A looser tension is maintained on the rear roller than on the weaving. This eliminates any strain on the fabric, while the special non-skid surface of the cloth beam holds the proper tension on the weaving being done. This makes it possible to weave long lengths of fabric that have an uneven surface which would ordinarily cause poor tension because of the uneven built-up on the front beam.

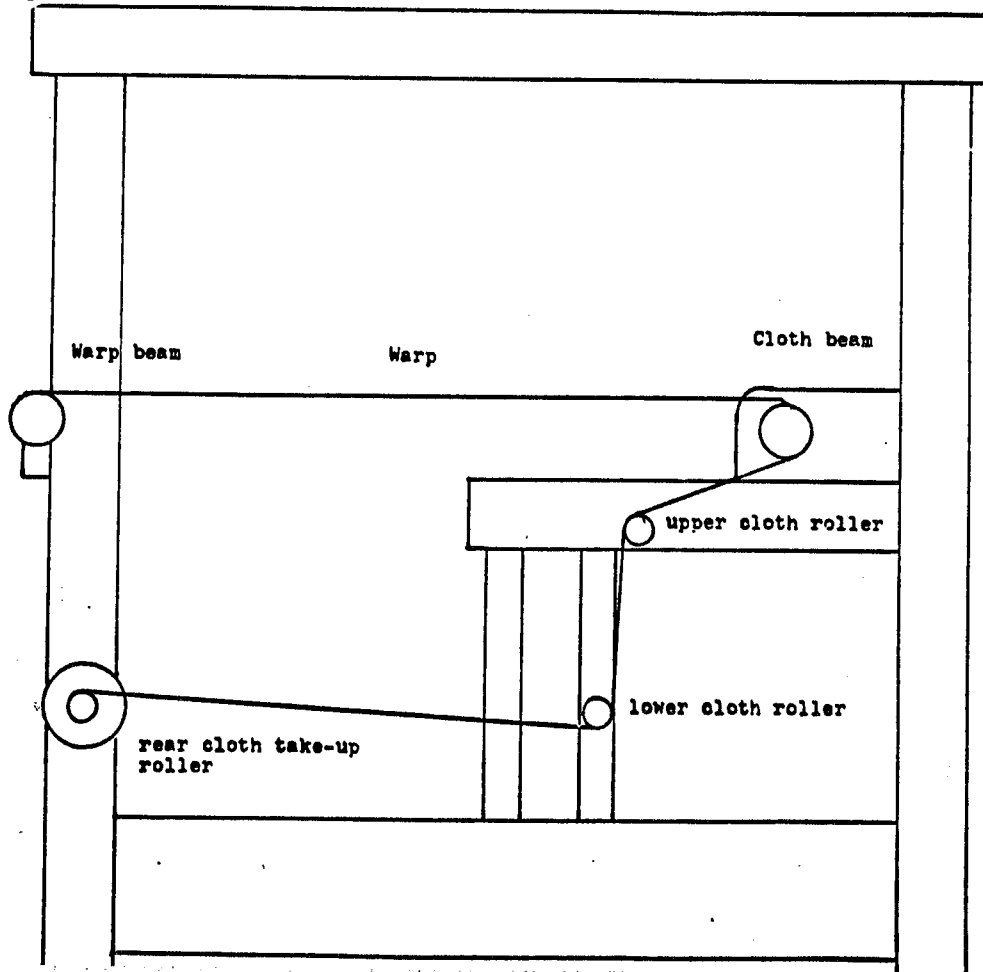
- 1) After weaving three yards on the front cloth beam, release the front ratchet and unwind the fabric. Then take it over the upper cloth roller, under the lower cloth roller, and over the top of the rear cloth take-up roller.
- 2) Remove the lease sticks from the front of the fabric so that the fabric will wind on nice and smooth. Then place the fabric on the roller, making sure it is centered and parallel; and fasten it on using 2" pieces of scotch tape placed vertically at 6" intervals. Wind the fabric around itself once, then pull out the stop pin, and allow the fabric to turn until it is tight.

If you are weaving a very thick fabric or a rug which would build up quickly on the front roller you may want to connect the warp directly to the rear cloth take-up roller without having to use the front beam for the first three yards. Make a set of exten-

sion cords which are four yards long. Put one warp stick through the ends of the cords and wind onto the rear cloth take-up roller until the cords hold the stick in place. Then take the cords around the small rollers as shown in the diagram and over the cloth beam. Place a second warp stick in the other ends of the cords to be used for tying onto. Adjust the rear cloth take-up roller so that the second warp stick is just a few inches in front of the beater in its rearmost position. The extension cords and sticks may be removed after three yards of weaving is done.

3) Now readjust the weaving tension by using the ratchet handle on the front cloth beam until the weighted tension lever rises, and continue weaving.

4) As the weaving proceeds and the cloth is wound forward, the weight on the pulley will gradually descend. Before the weight hits bottom, wind it back up to the top using the take-up drum on the upper right hand side. This will happen about every 1 1/2 to 2 yards.



# Extending The End Of The Warp

Near the very end of the weaving the extension cords are used again to extend the end of the warp beyond the warp beam, thus decreasing yarn waste.

- 1) Tie binding cords around the warp beam to secure the warp stick in the groove just before it makes its last turn.
- 2) Then, just when the warp stick is ready to fall out of the groove, remove bindings and lift it out.
- 3) Attach the extension cords to this warp stick at 3" intervals along the warp width using larks-head knots.
- 4) Slip another warp stick through the other ends of the extension cords, and place it in the groove in the cloth beam.
- 5) Lift the tension arm, and wind the extension cords back onto the warp beam.
- 6) Wind the warp forward from the front of the loom until the tension arm rises and continue weaving until the warp end is just behind the harnesses.
- 7) For those who ordered the second plain beam, make a special set of extension cords to be used only for extending the end of the warp. Make them long enough to reach from the second beam, under the dividing rod, and to the back of the harnesses. This way you won't waste any warp.
- 8) For those who ordered the sectional beam, the back extension cords are attached when the warp is first wound on. Please refer to the section entitled WARPING THE SECTIONAL BEAM.

# Using The Flyshuttle Beater

The Ahrens & Violette flyshuttle beater is designed to increase weaving speed. It has such a light and easy action and such little physical exertion is needed to operate it, that weaving can be done for hours without causing fatigue to the weaver. With a properly wound bobbin and a little practice of the throwing technique, selvage edges turn out automatically smooth and even.

1) To change the reed on the flyshuttle beater it is easiest to first remove the beater assembly from the loom, the sliding pickers will first have to be unsnapped and removed from their boxes, then remove the beater top and lay the beater down so that you can remove the thirteen screws from the reed support. Now lift off the reed support and remove the reed. Now it's just a matter of reversing your steps for installing the new reed. I know this isn't as convenient as simply slipping the reed in and out of a groove as on a standard beater, but on a flyshuttle beater it is essential that the reed stays in perfect alignment with the shuttle race, or else you'll have flyshuttles flying across the room, thus the necessity of the reedsupport and screws.

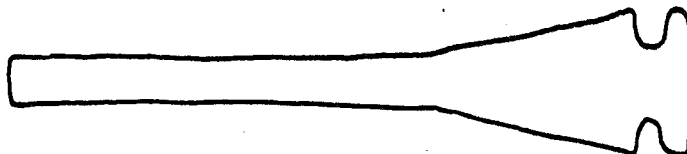
2) A properly wound bobbin is essential to the whole flyshuttle operation working correctly. If the weft thread does not come smoothly off the bobbin, if the shuttle jerks and pulls the selvage edge too tightly, or if the shuttle fails to move lightly across the shuttle race, look to an improperly wound bobbin as the cause of your troubles. If a bobbin is not working properly,

do not waste time fooling with it, place it aside to be rewound and use another bobbin.

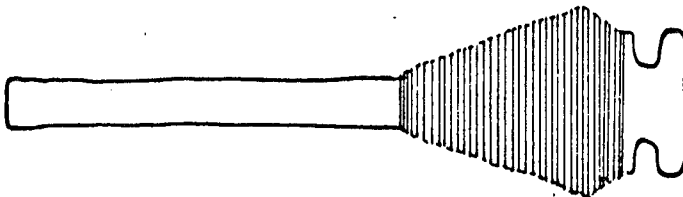
Our flyshuttles use a stationary open end bobbin (these are standard LeCler and more can be ordered through your local hand-weaving store). The advantage of using this type of bobbin over the conventional spinning bobbin is that as soon as the shuttle is caught or stopped the thread immediately stops unwinding from the bobbin, making it possible to get a cleaner selvage edge. These bobbins are wound quite differently than the spinning bobbins, they are npt wound back and forth from one end of the bobbin to the other, so please practice the following technique until you get it right.

Use a standard size bobbin winder; a hand winder will work but an electric one would be better; and some sort of tensioning device would be ideal since the thread must be wound very tightly for best results. Make a few winds of the thread over itself about one and a half inches down from the large end of the bobbin and then place it on the winder. Wind the thread TIGHTLY onto the bobbin in continuous overlapping two inch layers starting at the large end of the bobbin and working downward. Each layer will be tapered toward the small end of the bobbin and be cone shaped like the first layer which is pre-shaped for you at the large end of the bobbin. For each layer wind the thread tightly and quickly back and forth covering a two inch area until that layer is complete, then move down one fourth of an inch and start a new layer which will overlap one and three quarter inches of the last layer. Keep repeating these tapered overlapping two inch layers until there is one half inch left at the end of the bobbin. You will

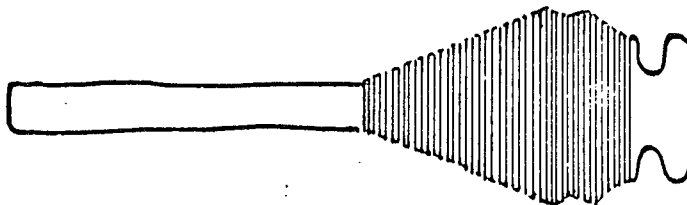
The empty bobbin



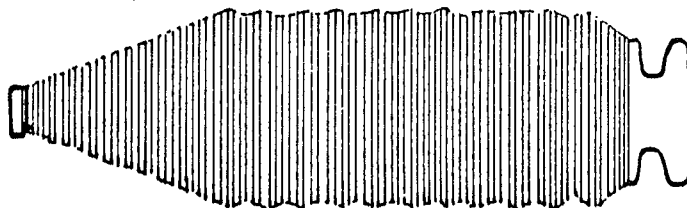
first layer of thread



second layer of thread



the bobbin filled



learn to know when each layer is complete: if the layers are too fat the bobbin won't fit into the shuttle, but if they are too thin you won't get as much thread on the bobbin and it will have to be changed sooner. Wind many bobbins at once so it won't be necessary to make many stops while weaving to wind bobbins.

Now uncoil about six inches of thread off the bobbin and pass the end of this thread into the hole in the end of the tension ring at one of the shuttle, and then out through the hole in the side of the shaft just in back of the round tension ring. You may need a small bent wire, latch hook, or crochet hook to accomplish this. Then pass the thread out through the hole in the side of the shuttle. Now pull up the metal rod on the shuttle and slip the large end of the bobbin onto it; it might be a little stiff at first. By turning the tension ring on the shuttle you can control the rate at which the thread comes off the bobbin, and when adjusted properly a clean selvedge edge will be produced. When the hole in the side of the shaft is opposite the hole in the side of the shuttle the least tension is put on the thread, and as you rotate the ring the tension is increased. Be sure to check the selvage edges after a little weaving is done and adjust the ring accordingly.

A little trick that speeds up bobbin changing is to make the change before you have completely run out of thread. Simply unwind the last little bit off the bobbin and tie the end of it to the end on the new bobbin, which is then pulled through the holes. This eliminates the necessity of having to rethread each time you change bobbins.



3) It's going to take a little practice to learn to throw the flyshuttle. Start out slowly and patiently. In the beginning you should only be concerned with learning the technique described below. Practice each step slowly and distinctly. This will form good habits which will become automatic; and it is after that that the speed will come.

You should practice at first with an empty bobbin; and then with weft thread when it starts to go a little smoother. Push the beater away from you to its rearmost position and place the shuttle on the shuttle race, and slide it into one of the shuttle boxes so that it pushes the picker as far as it will go to the end of the box. The hole in the side of the shuttle through which the weft thread passes must be facing the weaver. Place one hand on the flyshuttle handle and the other hand in the center of the beater and open the shed. To send the shuttle along the shuttle race and into the opposite box, make a short quick wrist movement with the handle in the direction the shuttle is to travel. Your body should be erect and relaxed and move only your hand and wrist. You will soon get a "feel" for the correct wrist movement. The shuttle should stop just at the end of the shuttle box without bouncing back or falling short. If the shuttle bounces back, too much weft thread will be let out of the shuttle and a loop will form at the selvage edge. If the shuttle falls short of it's goal, it will not be in the correct position for throwing the next pick. If the shuttle falls short, push it to the end with your hand. Next move the beater forward to the fell of cloth using a wrist action with the hand that is on the beater. Again, keep the body relaxed and do not waste energy by moving your body backwards.

Keeping the beater at the fell of the cloth, change sheds using the two treadles. This will keep each weft shot from "bouncing" back to it's rearward position, and the sequence starts again; this time throwing the shuttle to the opposite side; but be sure not to change hand positions.

Again remember, at first practice each step distinctly and do not be in a hurry. As you get better at it, the movements should become less distinct and start to flow into each other. The shuttle can be thrown as the beater is moved forward, etc. Eventually it should all become one smooth flowing movement. The weaver's body stays straight and comfortable with no strain as light movements of the hands, wrists, and feet are used to operate the loom. The weaver's eyes and attention are focused on the fabric being woven, constantly on the lookout for flaws, so that they can be corrected immediately.

When starting a new bobbin, there are two methods. One way is to throw the first shot by hand in the conventional manner holding on to the end of the thread, but instead of catching the shuttle send it all the way to the opposite box. The other way is to use the flyshuttle. Before sliding the shuttle into the box, take hold of the end of the thread with the hand that would ordinarily hold the beater. Keep on holding on to the end of the thread for this first shot.

4) If you are doing a weave that requires two or more shuttles to be thrown in succession, you will want to be hand throwing them as the flyshuttle beater doesn't lend itself to this type of weaving. On commercial power looms they have multi-box flyshuttle beaters that can handle numbers or different shuttles,

but they are quite complex and we don't feel they lend themselves to handlooms. Anyway, if you are doing a weave that requires the hand throwing of shuttles, you can do this with the flyshuttle beater, simply by unclipping the cords and handle and removing the sliding pickers so that they don't get in your way; and then use the beater as you would a standard beater. If you are weaving a wide piece in this way you might experience difficulty in getting the shuttle through the shed without interfering with the box sides. If so, just remove the four screws from each front box side and remove them. This will give you plenty of room to work.

# Warping The Sectional Beam

The Ahrens & Violette sectional beam is designed to be wound on to in separate 2 inch sections with use of a tension box. In most cases the yarn goes directly from spools or cones through the tension box and onto the beam, eliminating time spent at the warping board or reel; and the tension box automatically keeps a constant uniform tension on the warp throughout the warping process.

Another great advantage of the sectional beam, especially to the professional handweaver, is that it makes it possible to wind on very long warps which would never fit on a warping board or reel.

1) You must have enough spools or cones to be able to have one for each end in each two inch section. This will vary according to the size of the spools, amount of yarn needed, repetition of color patterns in the section, etc. You will also need a spool rack and/or cone rack.

2) You must make a set of extension cords to use with the sectional beam. Make them exactly like the ones you made in number 5 of the section entitled THREADING, SLEYING AND TYING-ON, only enough of them to have one for each two inch section of the sectional beam, and make them so that the closed loop measures 1 1/2 yards.

3) We recommend the use of Ahrens & Violette tension box with our sectional beam as it is designed to fit on the back of the loom with a special supporting rack, and because of it's unique features. The following instructions are for the Ahrens & Violette tension box; other tension boxes may function slightly different.

4) Place spools for the first 2 inch section on the spool rack which is lined up behind the loom. Take the ends from the spools and thread them first through the back of the tension box in their proper order. Then take them around the tension rods according to the type of yarn and the amount of tension needed. A heavy wool may only need to go in and out once through the bars; whereas a fine silk will probably need to go in and out around every bar and then around one bar an extra time. Experiment with this. Next, thread every other end through the heddles so that one end goes through a heddle and the next one lays between the heddles. This will create the threading cross later on. Last, thread the ends through the front pivoting reed. Since there is not exactly a two inch space inbetween the pegs because the width of the pegs take up some of the space, and since it is important that the ends lie flat in the sections so that an uneven built-up does not occur, we have designed this special pivoting reed. Thread the reed two inches wide, or just slightly wider than the space between the pegs. Then pivot the reed until the ends will just fit inbetween the pegs.

5) Attach one of the extension cords to the central pipe of the sectional beam in the first two inch section using a larks-head knot. Then tie the other end of the cord to the group of ends which you have just threaded through the tension box. Now wind this first section on, keeping careful count of the number of rotations. When there is about one turn left to go, it is time to make the threading cross. Raise the heddles up to get one side of the cross, and slip a marking tie in. Then push the heddles all the way down to get the other side of the cross, slip the

marking tie in again, and secure with a knot. Wind the rest of the first section on, cut the ends, and secure with scotch tape to the peg nearest to it which is away from the direction of the next section to be wound. Continue winding all the sections in the same manner, then undo the scotch tape and slip a pair of lease sticks through the threading cross.

6) If you are winding a very fine warp, say 40 ends to the inch or more, it may be more convenient to wind separate two inch sections on a warping board or reel, and then thread them only through the reed of the tension box to wind on. This will save on the number of spools or cones needed and on the time it would take to thread so many ends through the tension box. However, your warp will be limited in length to what will fit on the warping board or reel. Wind separate warps for each two inch section on a warping board or reel, marking the threading cross and making choke ties on each. Chain each off starting from the threading cross end. Then take the other end of the warp and place the loop ends through the reed of the tension box; pivot the reed appropriately; then have one person apply tension to the end of the warp as another turns the crank. Continue winding until the threading cross reaches the heddles. Then secure the end of the warp to the beam with scotch tape as above, and proceed to the next 2" section.