

## Assembly and Adjustment of Counterbalance Looms

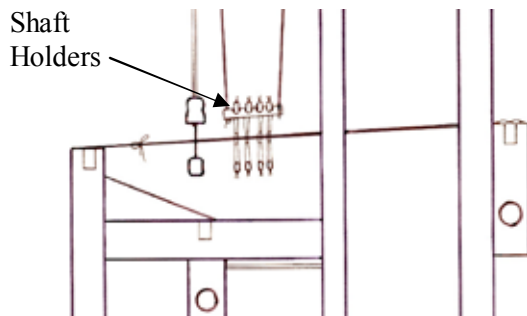
Read the introductory pages 1 to 9 for a better understanding of your counterbalance loom. Do not evaluate the shafts and sheds unless there is a warp on the loom and you are pressing a treadle down. You will have a good shed when you are throwing a shuttle across the warp. It is important to remember that the shaft bars do not need to stay level when you are not weaving.

### Overview

After the loom is assembled, warped and tied up for the first warp, treadle cords are put on, treadles are tied up and you are ready to weave. For your next warp, your initial tie-up can remain on the loom and it will not need to be adjusted. After your first warp, any adjustments you make will be for changing the treadle cords, adding ties for narrow warps or adding more shafts to your loom.

### Using Shaft holders

The first tie-up of the loom cords involves attaching tie up cords on the pulleys, dowels or horses above the shafts, which is explained on the next pages. First, the shaft holders need to be adjusted. Read about shaft holders in the introduction to counterbalance and counter-march looms, p 6.



The warp travels in a straight line from the back beam to the breast beam. See page 6 for setting the shafts and beater at the correct height.

Across the top of your loom you will have a bar or beam. It will either rotate or will have two pulleys like this one. The typical counterbalance pulley is encased in a wooden structure. The large hole is for attaching it to the counterbalance beam and the pulley is inside the narrow bottom.



### Tying up two shafts and two treadles

If you are weaving plain weave, you can thread and tie up just two shafts. Two long tie-up cords are needed for the top of the loom. The cords go one time around the pulley or on the roller bar as shown below and then all the ends are attached directly to the shaft bars. Texsol cord and arrow pegs work well for this tie-up. You will need two lamms and two treadles. There will be one treadle cord for each treadle. If you are tying up four shafts, you will need more pulleys or horses (see page 11). Texsol tie-up kits are available for counterbalance looms and they give you instructions for using Texsol cord and pins.

### Upper rollers

If you have an upper roller, button the cord on the screw and wrap the cord one and one half times around the upper roller. If you are tying up two shafts, you will now attach the cords to the shafts, directly below so that the cords are vertical.



The screw sits on the bottom side of the dowel for the tie-up.



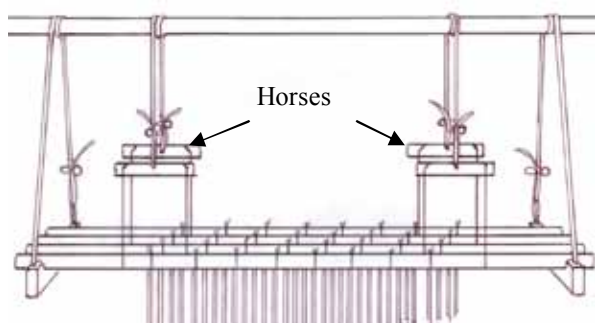
## Pulleys

If you have pulleys at the top of your loom, place them in the quarter point on each side of the loom, or out a little further from this quarter point, each the same distance from the center. Put the tie-up cord only one time around the pulley. Center the shafts to the loom.

## Four shaft tie-ups using pulleys and horses

Horses, which are wooden bars about 7 inches long, are tied between the pulley beam and the shafts. Four horses are used to tie up four shafts. They move when you are weaving, looking like galloping horses. Cords on the pulleys hold the horses, and 8 cords on the horses hold the shafts. Very wide looms will have more than two sets of these single pulleys with their horses.

The horses are placed approximately midway between the shafts and the top of the loom so that the movement of the cords and horses during weaving will not interfere with the movement of the shafts.



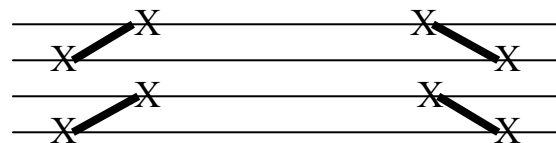
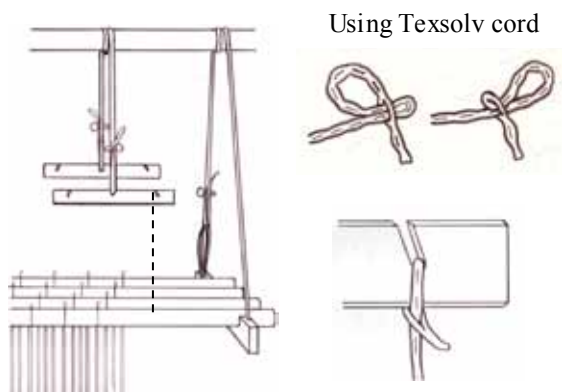
## Horses

8 Texsolv cords, about 11 inches long, are used to tie up the horses to the shaft bars. You will find these in the tie-up kit.

## Horses

Carefully drop one horse down to the shaft bar to determine the location of the cord. Attach a cord to the shaft bar at this location and put the other end of the cord on the end of the horse. The front horses are attached to shafts 1 and 2 and the back horses are attached to shafts 3 and 4. Remember to attach in mirror image configuration. Follow the instructions in your tie-up kit.

When all 8 cords are attached, center the tie-up on the shaft bars by measuring from the cords to the ends of the shaft.



Counterbalance tie-ups require that the cords are positioned to make a symmetrical tie-up, as in the diagram.

## Adjust the pulley tie-up cord

Tighten the top cord. These two pulley cords should be taut, but not so tight that they lift the shaft bars up off the holders. This finishes the tie up above the shafts. You will not need to adjust these cords again unless you add or take off shafts.

## Extra heddles

Remove any extra heddles to maintain good balance of the shafts. If you have open sides on your shafts, it is very easy to remove the extra heddles. Tie them into bundles, just like you tied your lease cross when you wound your warp. See p 3.

### Attaching lamms and treadles

Read pages 7 and 8. Attach the lamms and treadles according to your tie-up draft for the weave you have planned. Set the treadles about 4 to 6 inches off the floor. When you have more experience with your loom, you will know how high to tie the treadles.

### Adjust the height of the beater

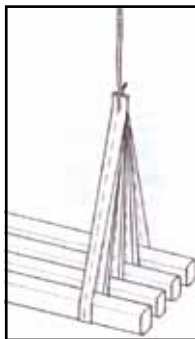
See page 6. The tensioned warp should be in the center of the reed.

### Narrow warps.

If you have a narrow warp, less than 10 inches wide or about 1/4 or 1/3 of your weaving width, it is best to do one of these three additional ties to control the ends of your shaft bars where there are no heddles. These ties stay on when you are weaving.

1. Cut 8 equal lengths of buttonhole elastic, about 12 inches long. Thread a Texsolv cord through the ends of each and make a loop in the cord. Tighten the loop in the cord and attach the other end of the cord to the top of the loom with a Texsolv arrow peg. Center the tie-up cord above the shafts. Attach elastic loops onto the shaft bars as shown in the diagram.

2. Leave one heddle at the end of each shaft. Cut 8 lengths of string, 6 feet long and thread each one through these extra heddles at the sides of the shafts. Tie these strings together to the breast beam and the back beam and tension them so that they look like warp threads.



3. If the above suggestions are not possible, use four large rubber bands, putting each around the ends of the four shaft bars. You will need one for each of the ends of the top and bottom shaft bars.

### Your tie-up is complete; you can weave.

Remove shaft holders and wire shaft pins.

Weave a couple inches before checking the quality of your sheds. This will give you the opportunity to correct any threading or sleying mistakes. It also spreads out the warp threads so that your sheds will be easy to see.

You may notice that the shafts do not always return to their neutral position after you lift your foot off the treadle. This is normal. As soon as you treadle the next shed, all the shafts respond to make the shed.

On a jack loom, the heavy shafts soon fall down after you lift your foot off a treadle. This is necessary for a jack loom to work properly, since the next treadle will not pull those shafts down.

### Check the size of your Shed

Read page 7. Remember that the size of the shed where you put your shuttle in, should only about 1/4 to 1/2 inch higher than your shuttle.

### Adjusting the size of your shed

If your treadle touches the floor before your shed gets to be this size, then you need to shorten your treadle cords for that treadle. If your treadle opens a shed that is larger than needed, lengthen the treadle cords a little, one or two holes in your Texsolv cord.

### Level Shaft Bars

Be sure your warp is centered and the shafts are also centered to the loom. Be sure your tie-up is centered.

### A flat bottom for your four shaft shed

If the bottom of your shed is not flat, you will need to adjust the length of your treadle cords.

1. Push on one treadle at a time. Look to see which threads are too low. Identify their shaft and write down which shaft it is. Do this for each problem shed. Number your treadles and write down the treadle number.

2. For each treadle you have listed, lengthen the treadle cord one hole in the Texsolv cord, or about 1/2 inch.

Treadle your sheds again to check them. They should be fine. You can adjust the cords another hole if the threads are still to high.

### **Unbalanced loom tie-ups**

3/1 sheds come to mind when discussing counterbalance looms, but actually an unbalanced weave is a little more difficult to weave on any loom. On jack looms you may get floating shafts which make your shed smaller. On the counterbalance loom, the three shafts that work together may not line up perfectly, but the sheds will be clean and easy to weave. Remember, you can always tighten your tension on a counterbalance loom and that will often solve shed problems. When tying up three or five shafts counterbalance for a satin, it may be easier to use elastic bands as your tie up. You can see these on page 11. When you get to know your loom better, you learn how to tie up unbalanced sheds so that you can weave them successfully.

### **Weaving unbalanced sheds**

I have never woven on a loom which will not weave an unbalanced weave, so do not be afraid to use them. After all, before the 20th century, weavers wove on counterbalance looms. They wove beautiful fabrics and many fabrics were woven with more than four shafts. And, unbalanced weaves were among them. If you have found a loom that gives you a problem with unbalanced weaves, re-read this chapter. You may find that you have skipped over some important information. You may find that your shed will be 1/4 or 1/2 inch smaller than your 2/2 sheds, but it will still be big enough for throwing a shuttle. You may also find that a shed will be 1/4 inch lower or higher. This too is not a problem.

### **Characteristics of unbalanced sheds on a four shaft counterbalance loom**

#### **Sheds with one shaft down**

When one shaft is pulled down and three shafts are pulled up, the one that is down will have a slightly tighter tension on the threads. That is fine, as a tight tension will support your shuttle. And since it is only one shaft, the threads will all be level. The three shafts being pulled up may not line up perfectly, but it is never going to interfere with your shuttle passing through. If your project requires that you only lower one shaft, you can adjust the level of all the shafts slightly lower. This will equalize the tension on the threads. Put the shaft holders on before adjusting the cord.

#### **Sheds with one shaft up**

When you raise one shaft, the shafts which are lowered may not all be on the same level. But since you have three quarters of all your warp threads on the bottom of this shed, there is no problem throwing the shuttle in this shed. You will not get skipped threads if your tension is tight enough. And if your project requires that all the sheds raise one shaft, put the shaft holders on and raise all the shafts slightly to equalize the tension.

#### **Weaves with both of these sheds**

If you are weaving double weave or another weave which requires both of these unbalanced sheds, put the shafts in the usual height position. The level of each shed may change, maybe about 1/4 to 1/2 inch higher or lower, but you will have sheds that are plenty big for your shuttle. Keep your tension tight as you weave. I have woven these weaves on both the tie ups with roller dowels and horses and the unbalanced sheds did not slow me down. And the sheds were good, even on looms with little loom depth. Even double weave pick-up was easier to do on the counterbalance than on the jack loom because the warp tension could be tighter.