

How to convert a 4 shaft draft pattern to weave on a Rigid Heddle Loom with 3 heddles



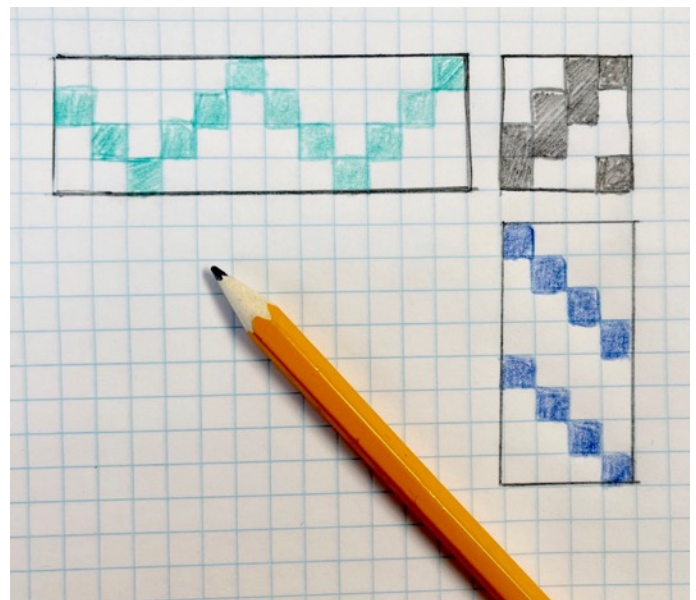
Converting a weaving draft so that it can be woven on a Rigid Heddle is not difficult - once you understand how!

In this tutorial I will show you how I “cracked the code” so that I can now weave any 4 shaft pattern on my Kromski Harp Forte equipped with three heddles.

To start with I selected a simple twill design. I have drawn mine out, but this method will also work with any 4 shaft pattern that you find.

I will be using light worsted weight cotton and three 8 dent heddles on an 8” Kromski Harp Forte. The warp is all one color as indicated on the draft with the green blocks. Our sample uses light blue yarn for this.

This is an Advancing 2/2 Twill which simply put means that 2 weft threads cross every 2 warp threads, forming a diagonal pattern.

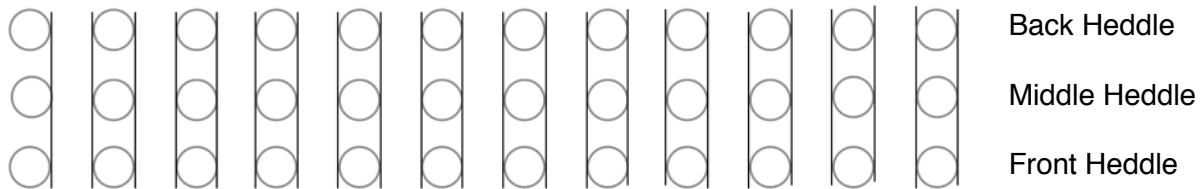


Let's begin by transposing this draft onto a template. You can find a blank template at the end for you to print so that you can make any pattern you like. Our numbers represent the shaft numbers from a 4 shaft loom. One is closest to the weaver. They are placed in the same order as the above draft.

				4						4
3			3		3					3
	2		2			2		2		
		1						1		

Image #1

Next let's take a look at the ridged heddle. Imagine that there are 3 heddles together. It would look something like image #2: The circles represent the holes in our 3 heddles. The spaces between are the slots.



Now you are wondering - "What about the 4th shaft?"

Picture what happens when the heddle is raised when weaving with a single heddle. The threads in the holes are lifted and "shaft #1" is engaged. When the heddle is lowered, "shaft #2" is engaged because now the threads in the slots are above the threads being pulled down by the holes.

The 4th shaft is created by the threads that go through the slots only. So the other heddles must go down.

We will discuss this at a later point. First let's continue planning our warp.

Image #3 below represents the yarn as it will come through the slots on the rear heddle when we initially warp using the direct warp method. There will be 2 strands of yarn (one loop) through each slot. This image is for visual reference to help keep you on track as we draw out our heddle plan.



Now things get interesting...
It's time to add the other heddles!

The diagram below shows how the yarn will travel through the heddles. Remember that we are working from right to left when reading a weaving draft. I have drawn the yarn with colors to more easily see where it travels.

- Shaft #4 is purple
- Shaft #3 is green
- Shaft #2 is gold
- Shaft #1 is red

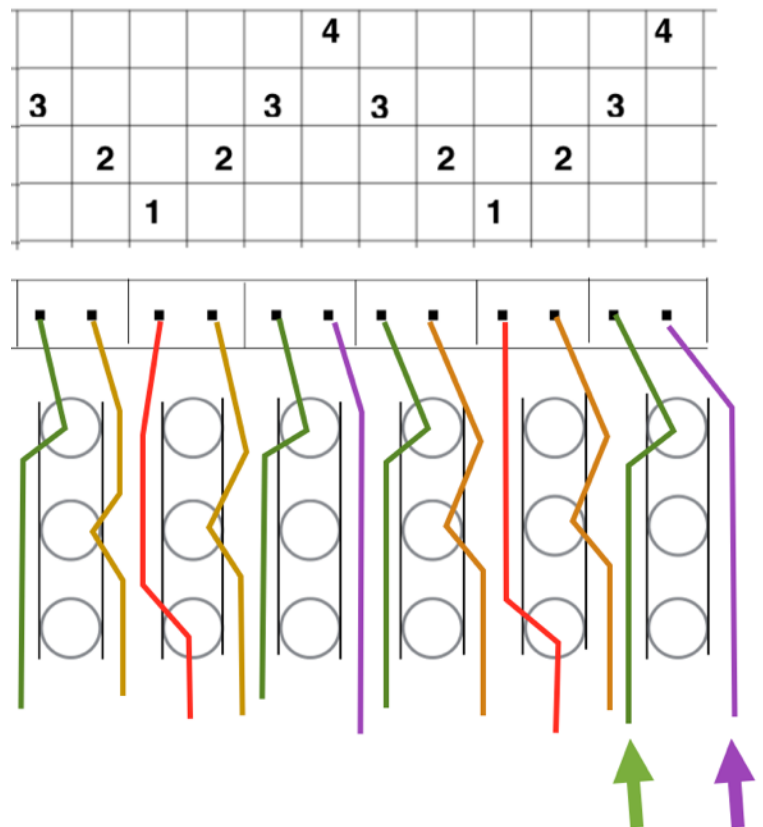
Look at the original template again (image #1).

Beginning on the right, the 1st thread will be on shaft #4. Draw a line from the yarn on image #3. Remember image #3 represents the yarn as it comes through the rear heddle when initially direct warped. This means the yarn is already in that slot on the 3rd heddle. This thread is indicated by the purple arrow.

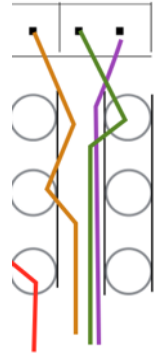
The next tread travels through the hole on heddle 3 and back into the slot for heddle 2 and 1. It will be removed from the slot when we actually warp the loom. This thread is indicated by the green arrow.

The next thread from shaft 2 travels through the slot on heddle 3, into the hole on 2nd heddle and back into the slot in the first heddle.

The next, through the slots on heddles 3 and 2, then into the hole on heddle one.

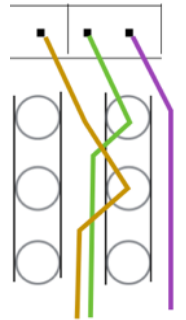


Continue in this way to draw out the remaining pattern. Notice they do not cross each other. When drawing out the warp plan, the most important thing to remember is that the yarn cannot cross over another yarn.



Look at the examples shown here. This must be avoided. If the first thread had gone in the slot to the left as shown here, the yarns would cross the other. Therefore, it will need to go in the slot to the right.

Likewise, if the 3rd thread, (gold) traveled through the hole to the right instead of the left, the threads would cross.



Once we understand this, the rest of our layout is fairly easy. Continue across the draft, bringing each thread into its proper slot or hole.

Next we will warp the loom!

Place one heddle into the loom. This 1st heddle will be warped normally with the direct warping method by drawing the yarn loops through the slots in the heddle. We will be using all of the slots on our 8" loom. This will give us 62 ends. The pattern will repeat throughout. Wind the warp onto the back beam as normally done.

Note: Some patterns need an added extra thread at each end to be used as a floating selvage edge. A selvage edge runs through the slots or outside the heddle itself. Each time the weft is passed through the shed it must go around this thread. This will keep the edges even where there may otherwise be no warp to support the weft. They are best to added after the warp is wound because they do not take up in the same way as the patterned threads. Hang weights on them to keep them tensioned. For the basic zig-zag pattern it is not necessary.



Now comes the task of following the diagram and threading the loom. I find it easiest to raise the back heddle and tie it in place while we work. A bit of waste yarn tied to the loom and wrapped around the top of the heddle, then tied to the front works nicely to support it. You may wish to do this on both sides.

Note: This is a different project in the photos, but it's the same concept. Look at the pattern we have drawn out for slot/hole placement.



The 1st thread (purple on diagram) runs through all 3 slots. Therefore, we leave it in the rear heddle, right where it is. Use the threading hook to reach through the front two heddles at the same time and draw the yarn through both slots.

The next thread (green) needs to be removed from the slot and placed into the hole on the 3rd heddle, then through the slots on heddles 1 and 2. This can again be done by putting the threading hook through both the slots at the same time. Pay careful attention to which slots you use.



The next thread (gold) will stay in the slot on the 3rd heddle. Take the threading hook though the slot in the 1st heddle and through the hole on the second heddle at the same time to grab the yarn.



Continue across the loom, paying close attention to the yarn placement, repeating the sequence until all of the warp is complete. It is helpful to tie the yarn into groups according to the number in the repeat sections as you work. Then remove the stabilizing strings, lower the 3rd heddle into place, and tie the yarn to the front beam.

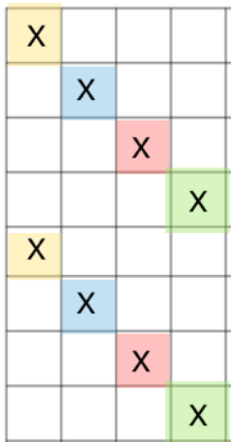
Once the loom is tied on, you'll need to understand the order of heddle lift needed to accomplish the pattern. For that we need to look 1st at the tie up. This is the block in the corner at the top right of draft. This represents the way the shafts are tied to the treadles on a floor loom. For us, this is how we know when to raise or lower our heddles.

Our tie-up looks like this:



The dark blocks are the shafts that need to be engaged. The bottom row is shaft one and the top is shaft four.

Below that on the draft is the treading order - or heddle lift order in this case.



Begin at the top (the yellow square). Follow the graph up the column to the tie-up. This indicates that shaft 1 and 2 are engaged. Put them both in the Up position.

The second (blue) indicates that shaft 2 and 3 are engaged. Put them both in the Up position.

The 3rd (red) indicates that shaft 3 and 4 are engaged. But we have no 4th heddle! Therefore, going back to when we talked about needing to lower the other heddles so that the yarn in the slots are "lifted", we need to place the other heddles *down* in order to raise the ones we need to engage.

Place heddles 1 and 2 in the Down position.

On the last row (green), shaft 1 and 4 are engaged. We use the same logic to know that heddles 2 and 3 need to go in the Down position.

Continue to repeat this sequence as you weave.

It may be easier, particularly for more complex patterns to write it out like so:

- 1,2 Up
- 2,3 Up
- 1,2 Down
- 2,3 Down

This will give you the basic zig-zag design if you repeat it throughout.

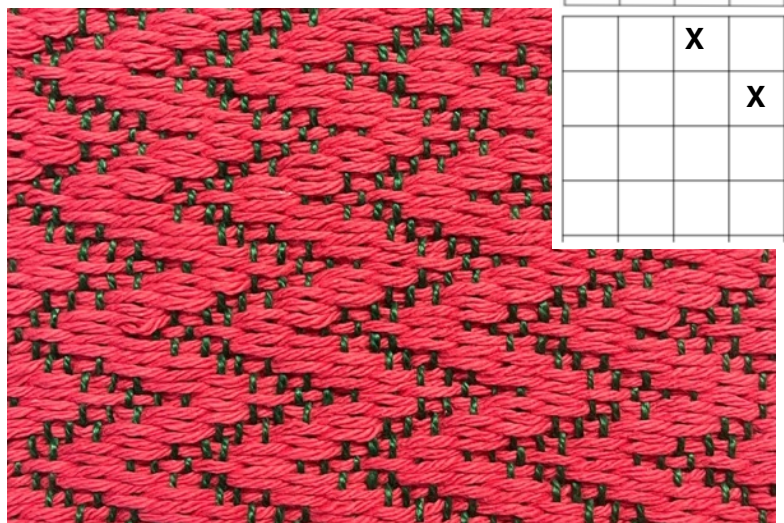
Have fun and experiment with the lift order for a different look!
 Try the pattern to the right - or play around with your own design!



X			
	X		
		X	
			X
		X	
	X		
X			
	X		
		X	X
			X
X			
	X		
		X	
			X
	X	X	
X			
		X	
	X		
X			
		X	
	X		
X			
	X		



You can now take any four shaft pattern and convert it to a rigid heddle design plan!



		X	
			X

Template to convert a 4 shaft draft pattern for weaving on a Rigid Heddle Loom equipped with 3 heddles

