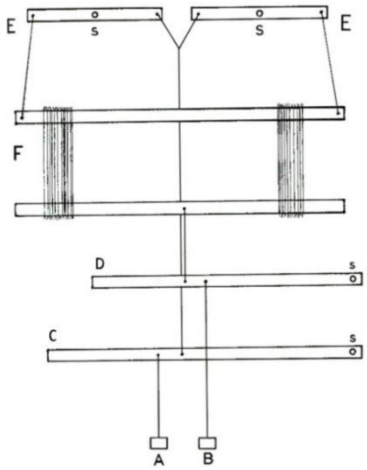
User manual for the Spring II and instructions for dressing the loom

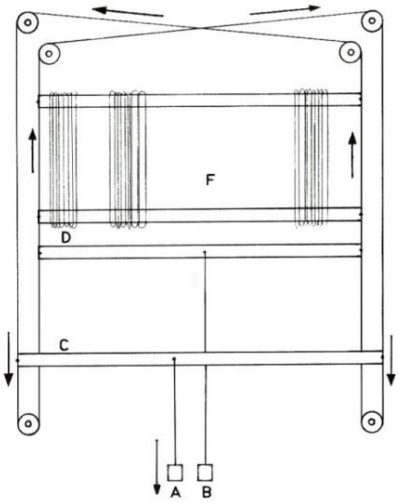
Operation of the Spring

Countermarch system

The Spring is equipped with the parallel countermarch system developed by Louët. Countermarch is the system whereby all shafts are actively involved in each shed: They are either lifted or pulled down. This creates an optimal shed, with equal tension on the top and bottom part of the warp threads.
Uneven sheds, where 6 shafts are lifted and 2 pulled down open cleanly. When a shed is made, the same tension is applied to the raised ends as to the lowered ones, resulting in the best shed in relation to the increase of the warp tension.



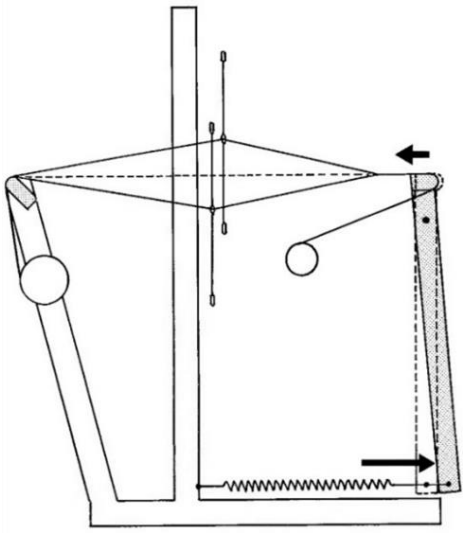
The traditional countermarch
look at the diagram to help you understand how a countermarch loom works. The points marked S are the pivoting points the lams C and D and the jacks E. Beneath each shaft are two lams. One of them is directly connected to the shaft and will pull the shaft down by pushing treadle B. When treadle A, connected to the jacks, is pushed down, the jacks will lift the shaft.



The Louët parallel countermarch
Each shaft is attached to a cord, which goes over all six rollers.The ends of the cords are joined, so the cord forms a continuous loop. When treadle A is pressed down, the lower lam C, attached to the outside part of the cord, moves downward, pulling the shaft up. Treadle B, connected to the upper will pull lam D and so the shaft down. The Spring II is a bit different: the shafts and the upper lams are connected to the outside part of the cords and the lower lams to the inside of the cord. It gives the same operation, but more space for extra heddles.

Compared to the traditional countermarch, the parallel countermarch has five nice features:
* In the traditional countermarch, the lams are hinged at the loom side, so that the movement of the pedals and the force required for operation depend on where the pedal is attached to the lam. In practice this means that only the middle part of the loom can be used for treadles. With the parallel countermarch, the lams remain horizontal during their movement. As a result, all pedals make an equal movement and treadle equally heavy. The entire width of the loom can be used for treadles, making it for the 90 cm Spring possible to accommodate the 14 treadles, common for 12 shafts.
* The parallel countermarch makes a compact loom construction possible, because the action space that the lams need is less than pivoting lams. The same counts for the rollers on top, compared with the jacks.
* Shaft bars and lams cannot slant. Their ends are fixed to the cords and when the cord moves, all parts of the cord have to move the same distance.
* There are no tie-up in the middle of the lower shaft bar, so you can move the heddles freely over the shafts.
*There are no cords connecting lams to jacks, running through the middle of the warp.

Because a shaft plus a lam are heavier than one lam, the shafts have a tendency to sag, whereby the treadles are pulled up and part of their tie-up cords slack. This can look a bit messy, but it has no effect whatsoever when weaving; the moment you press a pedal, the shafts move to the position for the optimal shed.



The moving breast beam

To facilitate the making of a shed, even with a high warp tension, Louët invented an action system for the breast beam. As a result, when making a shed, the tension on the warp increases less and less force is needed to operate the treadles.

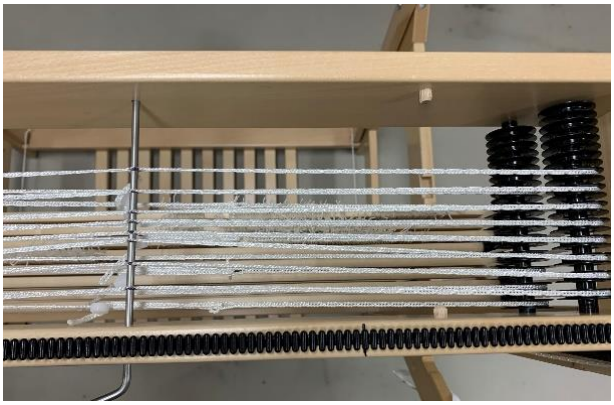
Looking at the diagram that shows the loom from the side, you will see that the shed is giving the warp a kind of parallelogram shape. Imagine, the warp is made of inelastic material, like metal wire, you will understand that making a shed is only possible if the distance between breast beam and back beam becomes smaller. When this distance is fixed, as it is on other looms, the shed depends completely on the elasticity of the warp. When the shed is made wider, the tension on the threads increases (enormously, in case of a less elastic warp). That causes heavy treadling and may damage the warp.

The moving breast beam also results that you have less loss of warp length; even if the end of the warp comes close to the shafts, you can still make a shed.

The moving breast beam is held by springs, adjustable to give your warp the tension needed for your project. Besides improvement of the shed and protection of the warp, the springs guarantee exactly the same warp tension after each time you advance the fabric.

Locking pin for the shaft cords

The function of the locking pin is to lock the shafts in their neutral position. To place the pin you have to temporarily remove the shelf at the top. Insert the locking pin through the hole at the back of the top rail, then through the marked corloops in the Texsolv cord and finally into the hole on the inside of the front top rail.



Blocking of the shafts is necessary in the following situations:

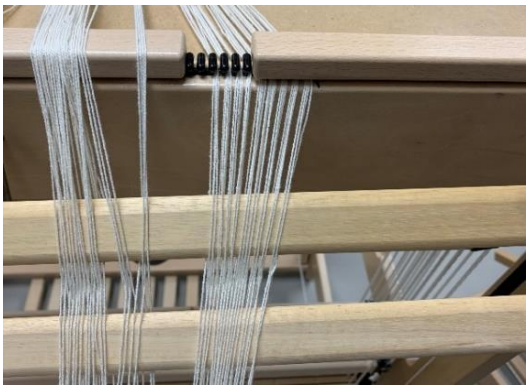
- While threading the warp through the heddles and reed.
- While tying the treadles.
- For locking unused shafts in their neutral position. Do not make a treadle connection to the unused shafts that are blocked in this way, because you will block that pedal and therefore cannot operate the other shafts tied to that treadle.

Warp sticks

The warp sticks are placed between the windings of the warp on the warp beam, so that the warp threads maintain an even tension. The Spring II comes with 16 warp sticks, which is sufficient for a warp of about 3 meters (10 feet). Extra warp sticks can be ordered as an accessory, but you can also use other sturdy material (for example flexible cardboard or the slats of a slatted curtain), if they are only a few centimeters longer than the warp width. You can also use sturdy paper strips, but they should be wide enough to give them firmness due to their curvature on the warp beam.

The raddle

The raddle on top of the loom has 2 openings per cm (That is very close to 10 per inch).
There are marks in three places along the raddle; in the middle and on either side at a distance therefrom corresponding to the distance between the tie cords on the apron bar. So you don't have to measure which part of the warp should go between those cords.



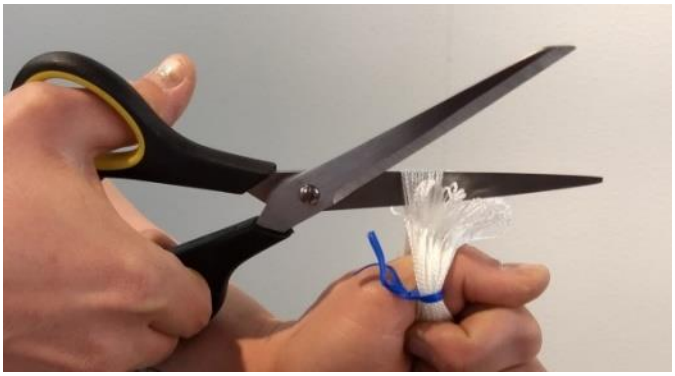
Raddle covers

You can slide the covers onto the raddle to prevent the threads not yet divided from sinking into the raddle. After dividing the threads in the raddle, slide these covers onto the raddle, to protect the threads from running out of the raddle while the warp is being winded onto the warp beam. See further information in step 4 of the warp setup instruction.

Texsolv cord and heddles

Texsolv cord and heddles are a Swedish product, crocheted from polyester yarn. Texsolv heddles combine the advantages of cotton heddles and steel heddles: they are silent and have an open eye. The bundles of 100 heddles consist of a zigzag folded double cord. The double cord is locally connected, forming the heddles. The 39 cm heddles for the Spring and the Megado are bundled per 50 pieces.

Installing heddles onto the shafts



You can cut the heddles apart by cutting all the loops that connect them at both ends of the bundle.

As an accessory we supply a heddle organizer, adjustable for different heddle lengths, on which you can divide heddles into bundles of smaller numbers. Tie these smaller bundles off again in 4 places, before removing them from the pins of the beam.

Tie the split bundles back in four places before removing them from the shaft bars or heddle organizer.

To avoid a big mess, do not remove the straps from the bundles until the heddles have been slid onto the shaft bars, the heddle organizer, or something else that secures the bundle.

For installing heddles onto the shafts, the lower shaft bars are easier to reach if you block the shafts in a slightly higher position with the locking pin.

First loosen the top shaft bar on one side by pulling the bar off the cord hook (do leave that hook with its knurled nut in the cord) and hang the heddle bundle over the top shaft bar.

Click the bar back onto the hook in the cord.

Loosen only the top straps of the heddle bundle and spread out the heddles a little.

Now loosen the bottom shaft bar on the side and insert it through the bottom loop of the bundle. Make sure that the bundle has no twist.

Loosen the two bottom straps and spread the heddles over the shaft. Click the bottom shaft bar back onto the cord hook. Check that the shaft bars are back in between the right shaft cords.

Texsolv cord

Texsolv cord consists of two cords, which are connected every 12 mm, forming loops in between. So the cord is a chain of loops. This makes tying the loom easier and afterwards adjustment unnecessary.
The Texsolv cords that come with the loom have already been shortened to the correct length. The shortening was done in between two loops in the cord.
When referring in this instruction to the first or last loop in the cord, always the loop is meant next to the one where the cord has been shortened, that one has no strength and should not be used.
If you cut texsolv cord yourself, prevent unraveling by singe the ends with a lighter. Be careful not to overdo the melting and be aware that melted polyester is very hot and will burn the skin.

The height of shafts and lams

The Spring comes with properly height adjusted shafts and lams. If a correction is needed, you can adjust the heights with the plastic knurled nuts at the ends of the shafts and the lams. You first lock the shaft cords with the locking pin through the marked cord loops. The correct height of shafts and shafts is very logical: the shafts must be so high that the tensioned warp threads run freely through the heddle eyes. Because the warp is slightly slanted upwards, this is at the rear shaft at the top of the eye and at the front shaft at the bottom (with 8 shafts slightly less at the bottom than with 12 shafts). The difference in height between the top and bottom lams of course corresponds to the difference in length between the long and short tie-up cords: 19.5 cm. Heights from the floor to the top of the lams: Upper rear lam: 56.5 cm and front lam 8 mm lower with 8 shafts and 10 mm lower with 12 shafts. Lower rear lam: 37 cm and front lam 8 mm lower with 8 shafts and 10 mm lower with 12 shafts.

Apron bars

Instead of wooden apron bars, there are metal apron bars with the Spring II. The advantage of these tie bars is that they are less thick and cannot tilt and because the beam cords can slide around the bars, both cord ends automatically have the same tension. With a narrow weave and/or with a high warp tension, the metal apron bars will bend because the middle beam cord stretches more. This is not a problem for weaving, but you can solve it by shortening the middle cord one or more cord loops at the screw head on the beam. Because some customers prefer the old wooden apron bars, we also include those so you can choose.

Threading through the heddles

Before threading the warp threads through the heddles, lock the shafts with the locking pin and check that there are enough heddles on each shafts.
Using only two shafts, in the case of tabby weaving and also weaving with a high chain tension, will overload the shafts and lams. Therefore, use at least four shafts for the threading.
With a narrow warp, always leave a few unused heddles at both ends of the shafts.

Reed

A 40/10 reed (4 openings per centimeter) is included with the Spring. Depending on the number of threads per cm, you can thread multiple warp threads through a reed opening or skip reed openings. Reeds with other densities (20/10 to 100/10) can be ordered separately. In North America we supply reeds with imperial seizes.

Adjusting the level of the beater

The hinge hooks of the beater are screwed into the barrel nuts in the bottom side rails. This allows you to adjust the height of the beater by turning the hinges down or up (clockwise and counterclockwise, respectively). You can lock and unlock the hinge hooks with the nut on their thread. The level of the beater must be adjusted on a height so that when the shed is open the lower threads just touch the lower reed holder. Check that the beater is the same height on both sides: When you make a shed, the lower warp threads must touch the lower reed holder on both sides at the same time.

Progressive shed

For an even (progressive) shed, in which especially the lower threads of the shed form a plane, it is necessary that the shafts make a greater movement the further back they are. Greater movement at the rear shafts occurs on looms whose treadle hinge at the front, as with the Spring, because the Tie-ups to the treadles are also further from the treadle pivot point. To further enhance this effect, the screw heads for the tie-up on the treadles are slightly further apart than the shafts themselves. Another help for a good shed is the fact that the warp is slightly slanted upwards due to a height difference of the breast and back beam. As a result, the threads run higher trough the heddle eyes of rear shafts and lower through the heddle eyes at the front shafts. The shafts that are pulled down will therefore take the threads with them further down and thus helps to create a flat lower part of the shed.

Tying up the treadles

With a countermarch loom it is a lot of work to tie up the treadles, because on average twice as many tie-ups have to be made as with a loom with a single-sided shaft movement. You also have to work low to the ground, but the new Spring offers a solution for that problem:

As an accessory we supply a set of four legs with which you can place the loom approx. 36 cm (14”) above the floor. If you are not very strong, you do need help from someone else. There will also be an accessory with which you can lift the Spring per side, so it is easy to mount the legs on your own.

This picture shows the Spring on its legs.

The tie-up cords for the treadles have already been shortened to the correct length. In their neutral position, the lams are adjusted to the same angle as the treadles, so that fixed lengths of tie-up cords can be used: the short ones for the lower lams 35.5 cm (14”)and the longer for the upper schemas 54.5 cm (21 1/2”).

With the shafts in their locked neutral position, the treadles hang obliquely upwards from the lams, their end being centered between the floor and the cross bar. The lams are also set in ascending order, parallel to the treadles. This is necessary to work with fixed length tie-down cords.
When you press a pedal on a counter-march (after you have removed the locking pin), all other pedals (which are otherwise tied) will go up and if everything is properly adjusted they will reach the crossbar, about the moment the pedal is pressed on the floor.

A recommendation when tying up your parallel countermarche loom - tie up all short cords first. Reading your pattern - which is likely geared toward a jack loom - tie a short cord for all shafts that indicate they need to be tied up - for each treadle. Once all short cords are connected, now go back and tie up a long cord to every screw head that remains open - on treadles you are tying up only, of course.A treadle pull the shafts up or down via the lams. A tie-up to the upper lam pulls the shafts down, a shaft is pulled up via the lower lam.

Before tying up the treadles, lock the shaft movement with the locking pin at the top of the loom.

When tying up the treadles, the cords must be attached around the lams with a strap in the notch above the relevant pedal.
The other end should be hooked onto the screw heads of the treadles.

Always use the first hole next to the loop where the cord is cut when attaching the cords to the lam and the treadle.

The mistake you can make when tying up the treadles of a counter-march is to tie a treadle to both, the top and the bottom lam of the same shaft. The treadle then blocks because it pulls the shaft both up and down.
Also, do not make a pedal connection to the unused shafts that are blocked, because you will block that pedal and therefore you cannot operate the other shafts connected to that treadle.

The mistake you can make when tying a counter-march is to tie a treadle to both, the upper and the lower lam of the same shaft. The treadle then blocks because it pulls the shaft both, up and down at the same moment.

Avoid this mistake by starting to tie the upper lams and routing those cords consistently in front of the lower lams of the same shafts to the treadles. Then you attach the short cords to the lower lams, onto each notch that does not have a cord in front.

Be sure to hook the cords in sequence onto the screw heads of the treadles.

Also, do not make a treadle tie-up to the unused shafts that are locked, because this will block that pedal and therefore you cannot operate the other shafts connected to that treadle.

Folding the rear part
To fold in the rear of the Spring, loosen the screw eyes at the bottom of the warp beam supports. If they are very tight, insert a screwdriver or something like that, as demonstrated during assembly. If there is a warp on the

loom, tighten it to keep the back section folded. If there is no, or a vulnerable warp on the loom, use a cord to connect the hinged rear part to the side upright of the loom.

Instructions for dressing the loom

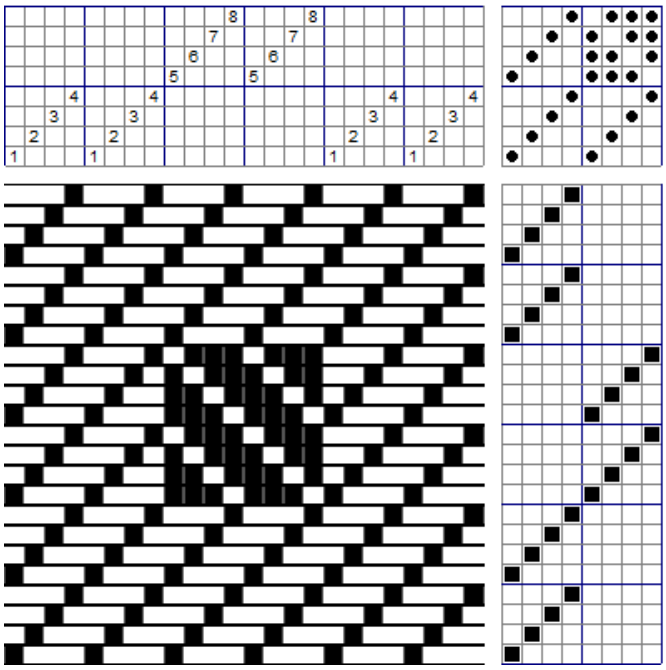
There are several methods of setting up a warp. If you are doing this for the first time, it is nice if you get help from another weaver. Over time, each weaver develops his own working method and tricks that match the loom and personal preferences. The instructions below are an extra service from Louët to provide an overview of setting up a warp on the Spring-II. Louët gives no further help in learning how to weave, you should consult the literature, a weaving teacher or other weavers in your area.

These are the steps that are covered in sequence:

1. Make the weaving plan
2. Make warp on warping posts or warping mill
3. Prepare loom for dressing
4. Divide the warp over the raddle
5. Beaming the warp
6. heddle threading
7. Reed threading
8. Tying the warp to the cloth beam

The weaving plan

In the weaving plan you determine how many threads and what length the warp should have.
When determining the warp length, you must consider the loom loss at the beginning and end of the warp. This loss for a fabric on the Spring is approximately 50 cm (20”). There is also shrinkage loss caused by the structure of the tissue. The shrinkage loss depends on the binding (the way the threads cross each other in the fabric), weave density and thread type. Learn to estimate this through experience.



The choice of the pattern is shown in a weaving draft. This is a drawing in which threading (top left), treadle tie-up (top right) and treadling sequence (bottom right) are defined. The square at the bottom left gives an image of the fabric that will be created.

Making the warp on a warping mill or warping bars:

To make a warp you can work with warping bars or with a warping mill. Especially for a warp longer that, a mill works faster. In these instructions we demonstrate the Louët warping mill.

With a wider warp, divide it into several warp parts of equal width. This gives less difference in the length of the warp threads on the warping mill and also works better when winding the warp onto the warp beam.

In this instruction we set up a warp for the entire weave width of the Spring 90 with 8 threads per cm. We make 3 warps of 30 cm and thus from 240 threads each.

Louët standing warping mill for short and longer warps, circumference 2.2 meter (7 feet).

Louët warping posts are useful for shorter warps.

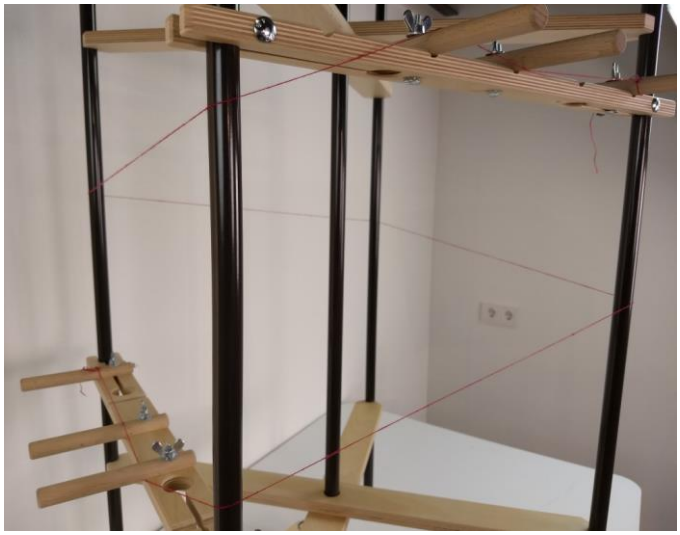
The Louët warping mill can be folded flat after assembly.
On the table, dowels are already mounted onto the two dowel bars. You can change their position later, according to the length of the warp.

Unfold the base of the mill to an “H” and secure that position with the wing nuts (on the newer mills these are plastic knobs; easier to fasten).

After you unfold the mill, fix it with the dowel bars: You can slide the bars onto the tubes from below and above; If you want to fix them between the crosses, you first have to hold them diagonally between the tubes and loosen the wing nuts at the ends a little further.

Attach at least two dowels to both bars.

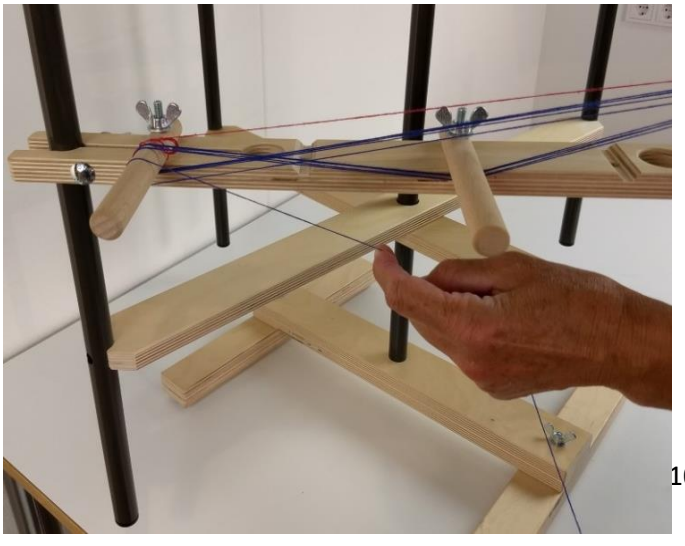
The guide thread



To give the warp the desired length, use a guide thread, to guide the route on the warping mill that you should follow. You take a thread of a different color than the warp and about 40 cm extra to attach the ends to the dowels.

Tie both ends into a loop, shortening the thread to the desired warp length. Attach one loop to a dowel of one bar and run the thread around the mill to a dowel on the other bar. Use the furthest dowel so that the thread also runs along the other dowels of the bar. You will need to move the bars and / or dowels to fit the desired warp length.
This first thread is now the guide for the route you have to follow when warping around the mill.

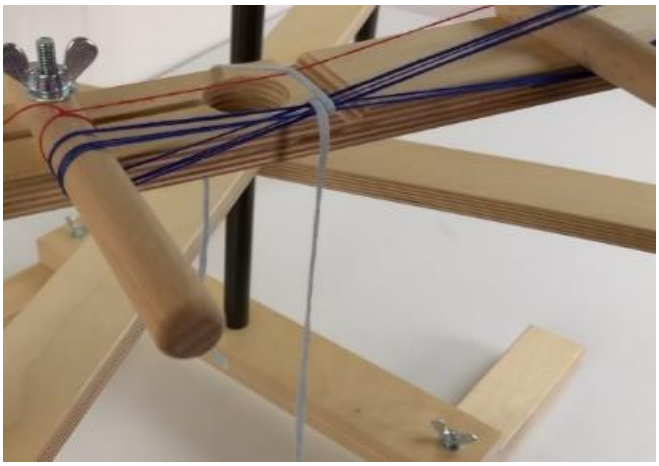
The cross

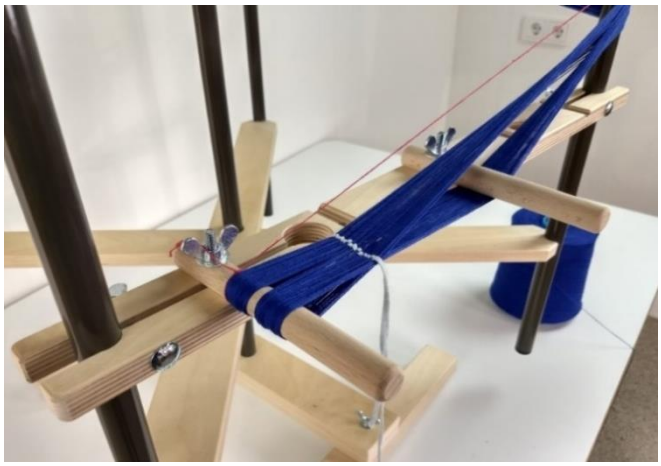


Attach the end of the warp thread to the dowel where the guide thread starts and follow the guide with the thread to the dowels at the other bar. Here you let the thread cross itself between two dowels on the way back. This cross ensures that you can thread the warp threads in the right order. At the other end of the warp, at the dowels of the other bar, we also make such a cross in these instructions. That's a "spare cross"; usually not necessary, but with tacky thread for the warp, such a second cross may be useful (see later in these instructions).
If you come across a knot in the thread , cut the thread

there, go back and make a knot at the end of the warp. If you change colors, you will of course also tie the thread together at the end of the warp.

The counting thread

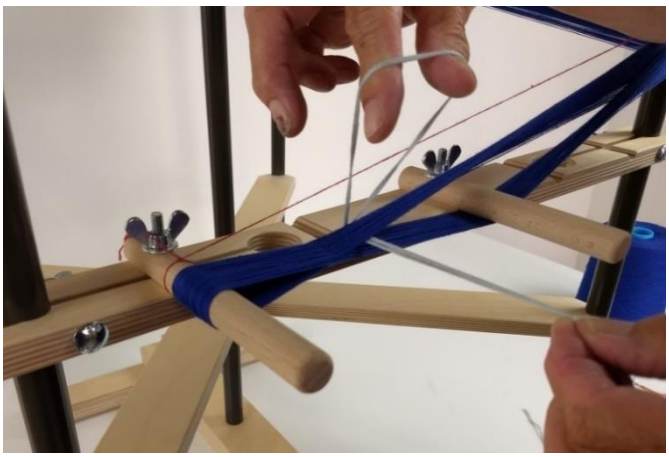


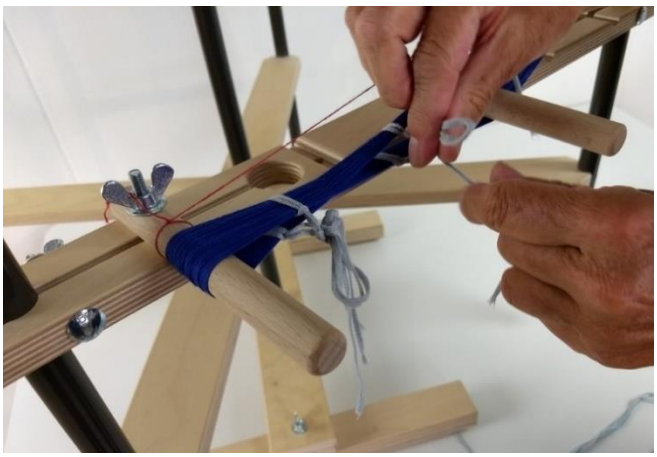


Use a piece of thread to count the threads. A shoelace, for example, is very suitable for this. Wrap this thread at the cross around the first 10 warp threads; cross the thread and do it again after the next 10 threads. You count the threads per 5 at the furthest dowel and because the threads turns back there, you have 10 threads at the cross.

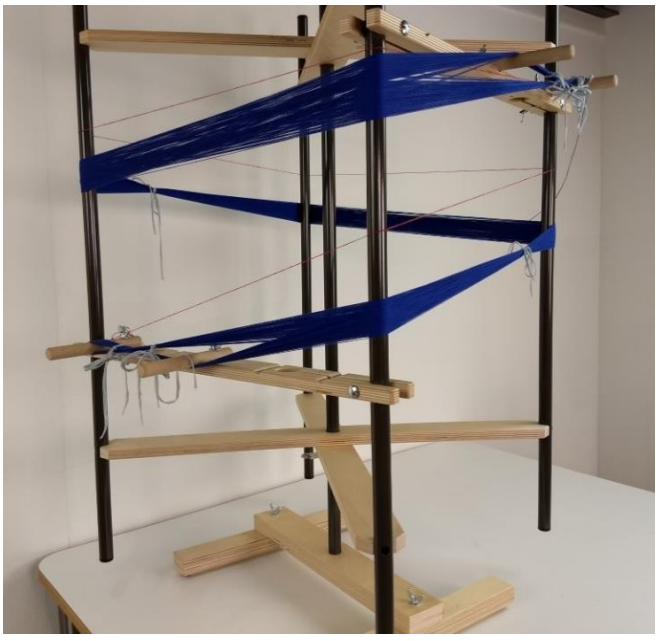
After 12 times 10 threads you will be at the center of this part of the warp. There, you make a mark with an extra cord. That mark will be the center of the entire warp and you will need it for dividing the warp in the raddle. After 24 times 10 threads, the first part of the warp is done and you can remove the counting thread.

Binding off the warp and its cross





Tie the cross in at least 4 places and if, as in this instruction, you made a second cross at the other end, tie that cross too. If you did not make a second cross, tie a thread through the loops around the last dowel.



Then you tie the warp in a few more places; at distances of about one meter. If you do that with bow ties, You do not need to use scissors when removing the bindings, with the risk of cutting a warp thread.

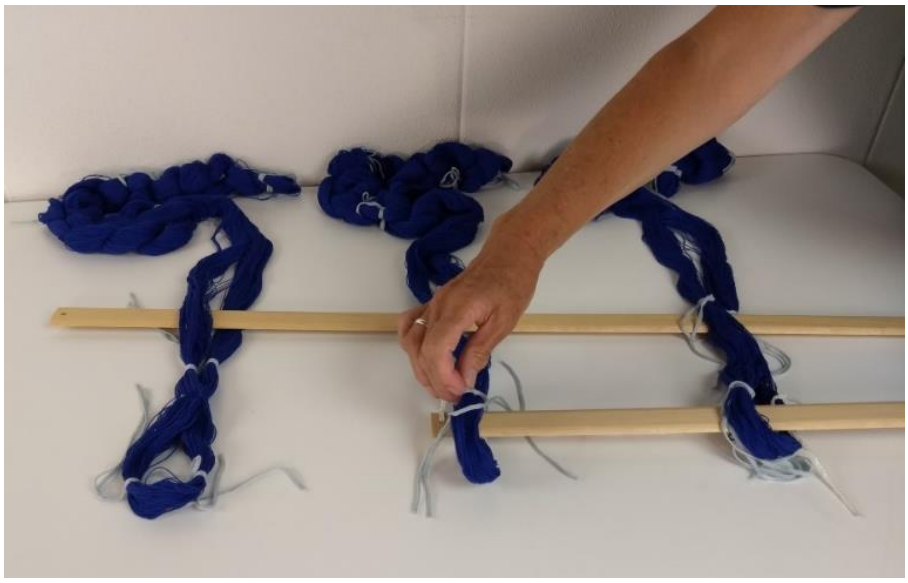
Taking the warp off the mill

Remove the end of the warp from the dowel. That will be the end without a cross If you have not made a second cross.

As you remove the warp from the mill, “hand hook” it to shorten it.

Repeat the entire process for the other two parts of the warp.

The installation of the lease sticks and dividing the warp in the raddle.



Insert the lease sticks through the warp on either side of the cross. Use the part that you marked in the middle as the second one, so this mark comes in the middle of the warp.
Make sure that the warp parts between the lease sticks have no twist.

Use 2 texsolv cords of about 50 cm (20”) to connect the ends of the cross bars. Use 2 long tie-up cords for the treadles or pieces of the cord from the bag “extra”.

On the picture, the loop has to be placed around the end at the lease stick. The sticks are now connected in such a way that their mutual distance can be adjusted by sliding the cord.

The ends of the cords should run in the direction of the warp.

dividing the warp into the raddle

By placing the warp in the raddle, you divide the warp threads in sequence over the weaving width of your project to be woven. This allows the treads to be wind, parallel to each other, at the same width on the warp beam without creating tension differences.

Place the warp over the loom (raddle closed with the covers) and attach the lease sticks with the cords to the hooks, where the springs are also attached. You can move the cords through the top lease stick a bit, so that they have approximately the same distance on both sides.

Now you remove the bindings of the crosses of the three parts of the warp.

With our looms, more and shorter raddle covers are now included. They are easier to move and with two length, the weaving width of all Louët looms can be covered.

The raddle has two openings per cm, so you are going to put 4 threads in each opening.
You will work from the center; both, the center of the raddle, which is marked, and of the warp, which you have marked yourself.
Place half of the warp on both covers and slide the strips a little apart.

From the cross, between the two lease sticks, you again and again take 4 threads in sequence and . When you get to the cover, keep pushing it a bit further away. After you have placed the first half of the warp into the raddle, slide the cover back over

that half and continue to divide the other half of the warp into the raddle mirror wise.

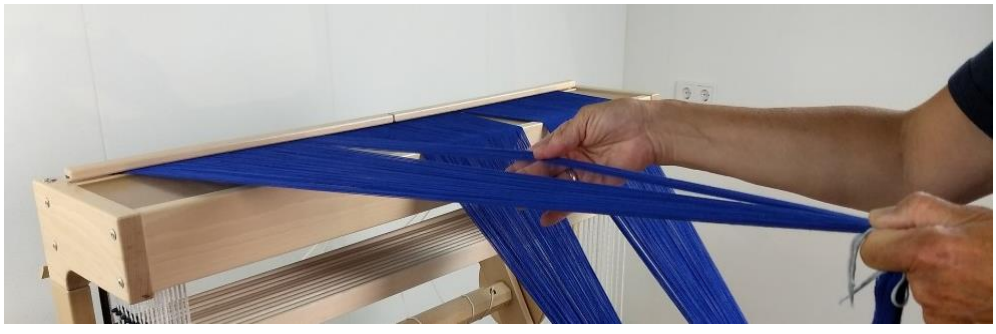
Make the connection between the warp and the warp beam by inserting the apron bar alternately through part of the warp and through the loop of a beam cord. At the raddle, in addition to a mark in the middle, there are also two marks at a distance from it that corresponds to the distance between the beam cords. So you can see exactly which part of the warp you should take between two beam cords.

With a wide warp, two equal parts of the warp will automatically end up on the sides.

Winding the warp onto the warp beam.

The warp should be winded on the warp beam under tension. For this you attach weights to the parts of the warp that hangs over the breast beam. Here we hang a weight of 1 kg on all three 30 cm parts of the warp. The total amount of weight when beaming is not that important, but it is important that the weight is distributed exactly over the width of the warp. So equal weights on equal pieces of warp.
For this warp we used woolen yarn. With less elastic material such as cotton or linen it is good to wind with a little more tension, so with more weight. Fabrics that you weave with a high tension, such as a ribbeb, you should also wind on with more tension.

Instead of the weights we use in this instruction, you can also use PET bottles with water.
In order to wind with a higher tension, you can work with more and therefore narrower warp sections and/or heavier weights.
To attach the weights to the warp, tie strings with a large loop.
Remove any binding from the first few feet of the warp.
While playing the harp with your other hand, pull the warp sections taut in order to organize the threads.



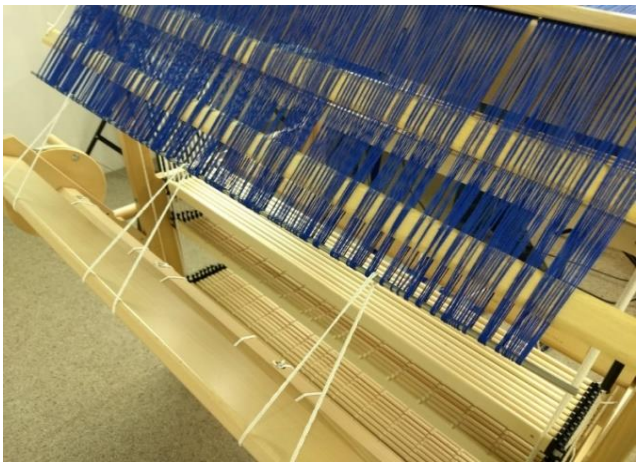
remove any ties from the first few feet of the warp.

While “playing the harp” with your other hand, pull

the warp sections taut in order to organize the yarns.

Wrap the loop of a weight around the warp part and pull the weight through.

Slide the weights with their loops to a spot on the warp where they hang just above the floor and tighten the loops.



Due to the weights, the warp threads are now taut and you can distribute them more evenly and parallel to each other over the apron bar: As regular as the photo shows. As regular as the picture shows is good enough.

Lift the brake handle of the warp beam a bit and wind up far enough that the apron bar has passed the back beam. Make sure that no yarns get tangled at the raddle or at the lease sticks.

Warp threads on the sides tend to run out to the side on the warp beam. The side clamps on the back beam help to prevent this. If necessary, while winding on, you can

occasionally place them slightly closer together than the width of the warp.

After the apron bar reaches the warp beam when winding the warp, place warp sticks between the warp and the beam cords on the first turn of the warp beam.
After that, you only have to re-install the beam sticks after the number of windings.

While winding the warp, the weights on the warp are pulled up and when they reach the breast beam you slide them down again, using their loop loosening and fastening them.

While winding, make sure that the warp threads run unobstructed along the lease sticks. If “stickiness” of the thread is a problem here, you may remove the lease sticks, at least if, as in this instruction, you have made a spare cross on the other end of the warp. Then, at the end you will insert the lease sticks through this cross, before removing the ties there.

At the last, lift the weights over the breast beam and wind on as far as the picture shows.

Remove the weights and cut the end loops of the warp. We didn't need the spare cross, so you remove those ties too.

Slide the covers off the raddle and take the warp threads out of the raddle and let the ends hang down from the lease sticks.

Threading the warp

To be able to sit closer to the work during the threading, take the cloth beam, the breast beam and the beater from the loom. If you have a chair or stool whose legs fit between the treadles, that is also useful. You can also place the breast beam on the side rails to support your arms.

Right-handers usually thread from left to right and left-handers the other way around. If you start threading on the left, slide the heddles far to the right so that you have enough working space.

There are different versions of hooks for threading through the heddles and through the reed. The Texsolv hook that we use here is very suitable for both purposes.

You will pick up the warp threads in order at the lease sticks; hang the cross bars so high that you can see them and easily grab the threads.

Take the number of heddles from where the threading sequence repeats or mirrors (pointed twill) and slide it over the shafts to the left. Take the first thread from the cross and pull it through the eye of the heddle with the threading hook. Then the second thread through the next heddle and so on.

Each time you have threaded the threads through the group of heddles, pull them up for a moment to check that the sequence is correct and that you have not accidentally threaded a thread above or below the heddle eye. If

you later discover that you made a mistake in the threading sequence, it is a lot of work to fix.
Whenever you have threaded through a few cm of warp width, make a loop knot in the bundle of threads.

Tip: Make the treadle tie-up now

Although it does not seem like the logical next step, it is useful to tie-up the treadles in this stage, because the beater, the cloth and the breast beam are not yet in the loom.

Now place the beater in the Spring and remove the top beater bar.

Use the two side clamps to clamp the reed to the bottom beater bar, along with a warp stick, keeping it flush with the front of the lower beater bar underneath the reed. This warp stick provides a better view of the reed threading and therefore prevents errors.

Now again you have the choice to work from left to right or vice versa. If your warp is narrower than the weave width of your Spring, divide that difference by two and that is the piece on the reed side that you will not use when you begin the reed beading.

We use the supplied standard reed of 4 dents per cm (10/inch) and therefore you will thread 2 threads per opening.

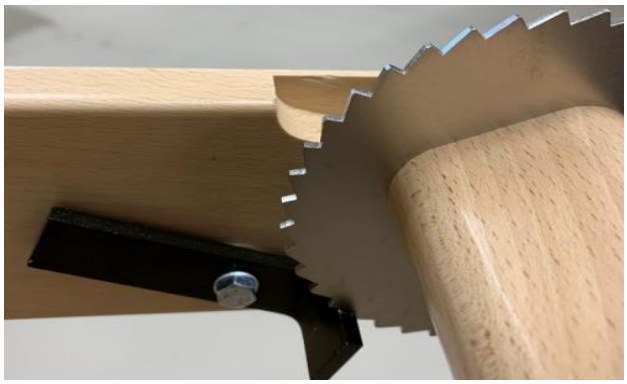
Pull out the knot of the first bunch of warp threads and thread them in sequence; insert the reed hook from below through the opening with the point of the hook facing you, put the thread around it and pull down. After threading the bunch, make a loop knot in the threads hanging from the bottom of the reed again. Repeat the threading with all the bunches of the warp.

Now you have finished the threading you may remove the lease sticks.

Replace the upper beater bar and secure it in the top of the uprights. Hold the reed and remove the side clamps and the warp stick.
Lower the upper beater bar side by side onto the reed, check that the reed is in the middle, then secure the holder on both sides with the star knob.

Tying the warp to the cloth beam

Place the cloth beam and the breast beam back in the loom, inserting the cloth beam lever into the cord loop.



Turn the pawl so that it engages the ratchet wheel.

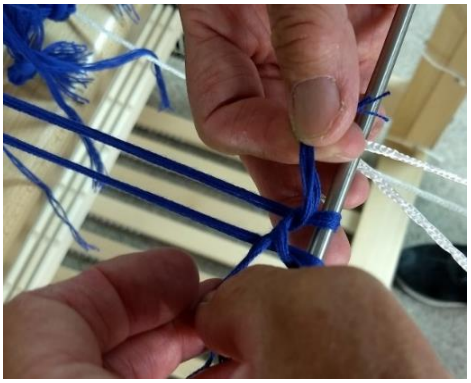
If you have locked the shafts higher than their neutral position, then lock them again in the neutral position.

Lift the warp beam brake handle and pull a bundle of threads up to the breast beam.
Now you can pull, after releasing the handle, all the bundles that bit forward.

Before connecting the warp to the cloth beam, the spring cords must be loosened from the floating arms of the breast beam. The breast beam is then blocked with the cords that connect the floating arms to the front posts.
If the breast beam is springy when tying the warp, the warp threads cannot be tensioned evenly.

Insert the apron rod through the beam cords and lead it around the breast beam and pull them tight.
Move them so that they form even angles and the apron bar is well centered so that it can pass over the cloth beam between the spring arms afterwards.

We are going to tie the warp threads in 2.5 cm (1”) bunches. That are 20 threads and with our 90 cm wide warp that is 36 bunches.


You work will from the center and the first bunch that you tie is to the left or right of the middle beam cord.
If you have made the bundles of warp threads of equal numbers, that center is easy to determine. If not, the center must measure exactly.
Run your fingers firmly across the threads towards you, to get even tension on the threads. Divide them into 2 x 10 and lead them around the apron rod, pull them tight and tie them in half a knot. Then tie the bunches alternately left and right in this way.

After all the bunches are tied, you will notice that the tension is not equal; the bushes towards the center, which were previously tied, have lost tension.
From the middle you go, alternately left and right, retighten the half knots again and repeat until the tension is about the same everywhere.

With a narrow weave and/or with a high warp tension, the metal apron bars will bend because the middle beam cord stretches more; see page 5

Adjusting the warp tension

Hook the spring cords onto the floating arms again, but the locking cords will still be taut, because there is now much more tension on the warp than you will be weaving with later. Lift the brake lever of the warp beam and the breast beam will come towards you and pull a piece of warp off the warp beam.

Before you start weaving, use the spring cords to set the desired tension of the warp for that project, by making the cords tighter or less tight. Do attach the cords on the left and right to the floating arms with a cord loop on approximately the same distance from the end of the cords and judge the warp tension at approximately vertical position of the floating arms.

If you have to wind the warp back a bit onto the warp beam, because the breast beam has pulled off too much warp, you must first take the pawls out of the ratchet wheel of the cloth beam.

As you shorten the cords, the springs pull harder on the arms of the breast beam and thus the warp. For a very low warp tension, you can use the top screw heads on the arms to attach the spring cords, where the cords are that block the extreme position of the arms.

If you weave with a very low warp tension, may be that tension is not enough to pull some of the warp off the

warp beam while pulling up the brake lever and advancing the cloth. In that case you have to turn the warp beam a little further by hand.

If you weave with a high tension the apron may bend. See page 5 for solving this problem.

Before you start weaving, you obviously pull the blocking pin out of the shaft cords and only block the shafts that you are not using.

Maintenance
Your Spring loom is easy to maintain. One month after you assembled it, retighten screws, bolts and nuts of the construction, including the screws of the top section that was already assembled. Thereafter, check all bolts, screws and nuts once a year.

General checks for proper functioning
- Check the level of the shafts, lams and treadles, while the parallel cords are locked by the pin in their marked loops.
- Check that the parallel cords run through the grooves in the black plastic ends of the lams and shaft bars.
- Check the correct height of the shafts, lams and treadles check the correct height of the shafts and whether the tie-down cords to the pedals are all about the same tightness. During these checks, the shafts must be locked in their neutral position

Troubleshooting

The shed is poor or hard to make
May be caused by:
- The treadles are tied too high or too low.
- The lams aren't adjusted at the right level.
- The beater is adjusted too high.
- The lease sticks are in the warp between the shafts and the back beam.
- The fabric should be advanced.
- The tie-up cords to the treadles cross each other.

A treadle cannot be pushed down
- The locking pin is still in the parallel cords.
- An error in tying-up the treadle: The treadle is tied-up to both the upper and lower lam of the same shaft.

During tying the warp to the apron bar of the cloth beam, the tension on the warp stays irregular
- The spring cords have not been unhooked from the screw eyes of the floating arms or one of the short cords doesn't block the floating arm.
- The brake cable doesn't run properly over the brake disc or the cable needs to be tightened.

The warp wouldn’t come off from the warp beam.
- While weaving with a very low warp tension, the warp wouldn't pass the cross sticks: Take them out. If that doesn't solve the problem, you have to beam the warp beam by hand, while lifting the brake lever.

The cloth is slanted
- One of the threaded eyes that hold the warp beam supports came lose.
- The beater is not adjusted on the same level at both sides.
- The tension of the springs is not the same on both sides.
- One of the spring cords has slipped of the roller.

The cloth cannot be advanced
- One of the ratchets of the cloth beam is not in the ratchet wheel.
- The apron bar of the cloth beam is caught on one of the floating arms.

The brake cable spring comes loose from the screw in the lever

- The screw should be screwed in less deep.

A tie-up cord gets caught behind a screw head of a pedal

- Screw the screws a little deeper into the treadles.

Notes