The background features a collage of various weaving-related diagrams and patterns. At the top left, there are handwritten labels: 'J3', 'SK-8', 'SP-8', and 'ST-8'. In the top center, there is a handwritten note in Finnish: 'loimi- ja kudel- vaittaista pomsia yhdistetty.' To the right of this, there are vertical labels '2x', '2x', '2x', '8x', and '8x'. Below these, there are labels 'A', 'B', 'C', 'D' and 'Tie-up'. In the middle right, there are labels '1211109', '578', '1000', and '345'. At the bottom right, there are labels 'Oikeampioleisen rakenne.' and 'nuoleisen rakenne.'. At the bottom left, there is a label '3-752 K'.

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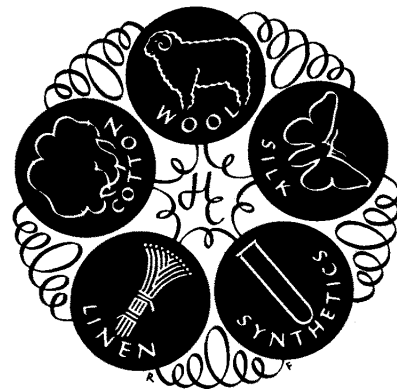
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March - April 1959

No. 44

SHORTCUTS

SECTIONAL WARPING

Much as we should like it, we can not give here a detailed description of this method. After all what we are concerned with here are Shortcuts, and nothing else. Those of our readers who would like to have the whole story may look it up in The Encyclopaedia of Hand-Weaving, or in the Modern Weaver No.3 Vol.4 *).

There are three factors which make the sectional warping a headache. First, the necessity of having large numbers of small bobbins of the same size. Second, the difficulty of keeping the same tension of all warp ends in the same section. Third, the difficulty of getting a high enough tension of the warp, so that it would not slip later on. We shall take up these problems in the above order.

1. The only case when we really need sectional warps is when the length of warp is more than 30 yds. With shorter warps a warping mill is superior in all respects. But with really long warps we can usually dispense with rewinding the yarn on bobbins, simply by buying it wound on $\frac{1}{4}$ lb tubes, or soemtimes on $\frac{1}{2}$ lb tubes.

For instance if the warp is 50 yds long, and 36" wide we shall use 18 sections, and each bobbin should have 50 times 18 or 900 yds of yarn. Although we can wind these bobbins at home if we have plenty of time, and a yarn counter, it is much easier and cheaper in the long run to use ready made tubes.

*) This issue is still available. It has five pages on sectional warping. Please send 75¢.

In the above example 900 yds is just a little less than $\frac{1}{4}$ lb of 10/2 cotton, or of 25/2 linen, or of 14 single linen, or 16/2 wool, and also less than $\frac{1}{2}$ lb of 5/2 cotton, or 12/2 linen, or 8/2 wool. In each case we must buy as many tubes of yarn as warp ends in each section. What remains on each tube can be used for weft or for a shorter warp made on a warping frame or a warping mill. The tubes after being used should be marked with a number indicating the length of yarn remaining on the tube. For instance if we had a $\frac{1}{2}$ lb tube of 6/2 cotton (1260 yds) and used only 900 yds, then what remains is 360 yds. We may find this information invaluable later on when we make a similar sectional warp either shorter or narrower.

When warping directly from tubes we should use a bobbin rack on which the tubes will unwind from one end. Care must be taken that all tubes unwind in the same direction. Tubes must be held in vertical or nearly vertical position.

The following remark applies to all sorts of warping. When tubes or bobbins are placed on horizontal shafts in a standard rack, they rotate when unwinding. This turning often produces vibrations particularly when the warping is fast, and the vibrations change the tension of yarn. Therefore whenever we can, we avoid standard bobbin racks, or go slow. This danger does not exist when the yarn is unwound from one end of a tube.

2. Most tension boxes have one fault: they give a uniform average tension of each section, but they can not prevent a difference in tension between warp ends in the same section. If one end will get tighter than the rest, it will slip on the rollers, and may cut deep into the already beamed warp. Since no two tubes of yarn will unwind with exactly the same resistance, the warp is hardly ever completely uniform.

Yet this problem can be solved very easily. Each roller should be taken out of the tension box and coated with a soft, but rather rough and strong fabric (soft felt, heavy flannel etc). A strip as wide as the roller is cut from the fabric, the roller generously painted with glue, and then wrapped in the fabric. The surplus of the fabric is cut off, and the roller returned to the

tension box. Now the warp ends can not slip on the rollers because of the friction offered by the soft fabric.

3. When the tension of the warp is uniform but not high enough (that is the warp is comparatively loose on the warp beam) we cannot avoid slipping of the warp during weaving. What happens is that one layer of the warp slips on top of the next one until the warp is so tight that it can not slip any more. Keeping the warp slack during weaving will not help, because it will slip anyhow during beating.

With many yarns this does not matter. An elastic, strong, and smooth yarn will tighten uniformly, and we shall hardly notice it. But fine, sticky, or not elastic warp will be ruined because one layer will tangle with the next, some warp ends will get caught in the layer where they do not belong, and they will stretch or even break.

In plain beaming we can always separate layers of warp with paper. But this method becomes extremely difficult in sectional warping, where we must use strips of paper exactly 2" wide and as long as the warp.

The only way is to get the right tension during beaming. A good tension box should be made in such a way that the tension be adjustable in large limits. If it is not, use two tension boxes one after another (the additional box can be mounted on the breast piece of the loom). All sorts of substitutes can be used as well if the yarn is not damaged by friction. For instance a pair of lease-rods (single cross) can be mounted in front of the loom, and if this is not enough then two pairs. The warp as it comes from the rack can be wound in a piece of chamois leather tied tightly to the breast piece. Several dowels (broom sticks) can be placed alternately over and under the warp, and then tied together in a bunch to the breast piece. One thing here is important: that whatever contraption to increase the tension we are using it must not be re-tied or readjusted when changing from one section of the warp to the next. Therefore a helper who would hold the warp tight when beaming is worse than useless because he could not possible keep the same tension all through the operation.

 THE WARPING MILL

The modern Warping Mill is in itself a shortcut, and when it is properly constructed there is little to be said about it. Please read the description in the Master Weaver No.8 and 9.

The warping is quite fast when made with two tubes of yarn. For large warps one should use a much higher number of tubes. There is no advantage in warping with 4 or 5 tubes because what we gain in warping, we lose in making the single crosses at one end of the warp. Thus we should use either two or ten tubes. A higher number up to 18 is possible but not very practical.

The question is whether keeping all crosses single at one end of the warp is worth while. In our opinion it is not.

Thus perhaps the best method would be to keep to double crosses all the time. For small warps use just two tubes and dispense with the heddles of the heck-block. For large warps use 10 tubes and cross them in pairs. Thus tubes 1 and 2 go through the same heddle of the heck-block; 3 and 4 through the opposite heddle; 5 and 6 through the next and so on. When making the first cross (for spreading) we shall have 10 x 10 ends, and in each cross for threading: 2 x 2 ends.

Warping from 10 tubes is extremely fast, because one portee has 20 warp ends, and a warp of 1000 ends is made in 50 portees.

In exceptional cases we may use any number of tubes from one to 20. But if we want to have uniform crossing we must use an odd number of heddles in the heck-block: 3,5,7,9 etc.

When working with a counter we must remember that the counter turns only one way. Thus if we made a mistake - coming back does not subtract from the number shown by the counter. Just the contrary it shows another portee. If the mistake was in portee No.5, when correcting it we come back to portee No.4 - but the counter will show portee No.6 instead. Thus every mistake which requires coming back to the first cross counts double.

The warping with a large number of tubes requires some attention being paid to the broken warp ends. Since the operator does not need to watch the warping mill, except for the counter, he should concentrate on the rack, and unwinding of the tubes.

PLAIN SWIVEL

This is one of those things we have overlooked. We had a very short article about Swivel in 1952, then one about the Turned Swivel, and one about multi-block turned Swivel, but we have never described plain Swivel in detail.

The name comes from power weaving, and this is why: when Swivel was woven for the last time on hand looms in England in the beginning of the nineteenth century, it was called Spot Weave. Thus when we re-discovered Swivel we could not possibly call it by its real name, because this was already used for Spot-Bronson, and even for the Swedish Spetsvav.

However if Swivel was forgotten by handweavers, it was not so in power weaving. There it developed to the point, that it is woven not only in tabby, but in any basic weave, or the pattern in one weave, and the ground in another, usually simpler one. But it kept its "spotty" effect, that is it was used for small patterns widely spaced on a uniform background. To save on yarn the pattern is woven locally so that the shuttle does not go across the whole shed. This special shuttle arrangement is called "swivel".

So much for the terminology.

The weave itself belongs to the class of Spot Weaves. The difference between Bronson and Swivel is very small in drafting, but enormous in practice. In theory both weaves have a tabby ground with floats in weft. But in Bronson these floats form the pattern, when in Swivel they are completely disregarded or even cut off. What is pattern in Bronson is ground in Swivel and vice versa. In Bronson we use the same colour in warp and weft, when in Swivel the pattern weft must be of a different colour than the ground.

In many cases the same threading can be used for both weaves, although usually the blocks of pattern in Swivel are much larger than in Bronson. However if the same draft is woven alternately in Swivel and Bronson, we must have two tie-ups for the pattern (the tabby is the same). Fig.1 shows such an example. To make the draw-downs more

block being reserved for the ground. But then by analogy we have two-block Spot Bronson. Therefore we should call this kind of Swivel: Spot-Swivel. And exactly as we have All-Over-Spot, or All-Over-Bronson (also called Barley Corn), we may have All-Over-Swivel with three blocks of pattern on 4 shafts, as in fig.2.

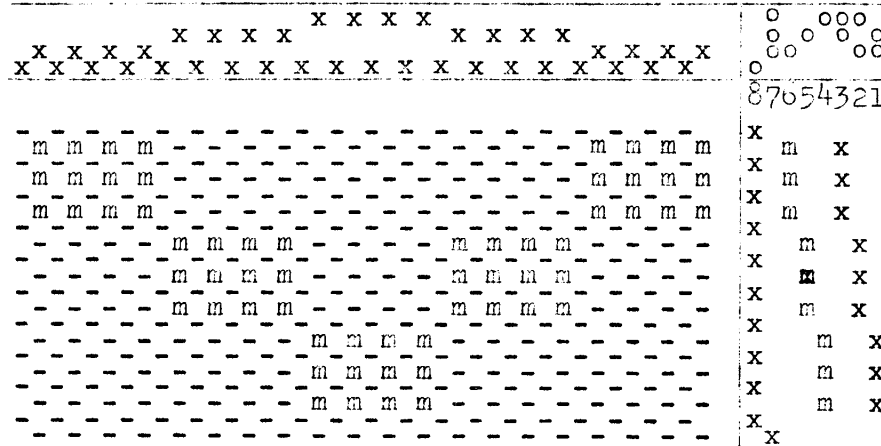


Fig.2

Let us now classify all the variations of the Swivel.

1. Spot Swivel. Small patterns on plain ground.
2. All-Over Swivel. Pattern covers the fabric. Draft identical or similar to Spot-Swivel.
3. Swivel Effect. All-Over pattern in tabby on tabby ground made on any traditional pattern draft: Overshot, Diamond Twill, Crackle, Summer & Winter, etc.
4. Turned Swivel. Colours both in warp and weft.

Any of the above variations can be woven on four or more shafts. There may be just one colour or more. Thus we may have: multi-block swivel; multicolour swivel; and multi-block-multicolour swivel. Finally we can use Swivel in double-weaving and call it Double Swivel.

There are three ways of weaving (treadling) any of the above variations of Swivel Weave. As an example we shall take the draft in fig.2.

First method. One shot of pattern is followed by two shots of tabby. The ground weft is about the same as warp; the pattern weft softer and a little heavier. The treadling:

- 8 -

1-st block: 6,7,8; 2-nd block: 5,7,8; 3-rd block: 4,7,8.

1-st & 2-nd Bl.: 1,7,8; 1-st & 3-rd Bl.: 2,7,8;

2-nd & 3-rd bl.: 3,7,8; 1-st & 2-nd & 3-rd bl.: 7,7,8.

This last combination of blocks requires an explanation. All three blocks mean a solid line of colour all across the fabric (No.7 treadle with pattern weft). Yet it must be followed with ground on the same treadle. Otherwise the texture of the fabric will not be the same as in case of other blocks.

The two wefts: pattern and ground run parallel at least some of the time, and they can easily twist around each other. This must be avoided at all cost. In many cases under conditions difficult to foresee this twisting does not take place. Then of course there is nothing to worry about; yet we should examine the fabric very closely from time to time. If the twisting occurs (the pattern weft disappears partly under the ground weft) we proceed as follows: after opening shed 7 we throw the shuttle with the ground weft as usual, but we do not beat. We change first to the shed 8 and beat afterwards.

Second method. The shot of pattern is followed by a shot of ground on another pattern treadle which makes one shed of tabby with the pattern, as in the lower part of fig.1. Treadle 4 after 1; tr.5 after 2; 6 after 3; 1 after 4; 2 after 5; and 3 after 6. Then both shots are followed by tabby on treadle 8. For instance:

1-st block: 6,3,8; 2-nd block: 5,2,8; 3-rd block: 4,1,8.

1-st & 2-nd bl.: 1,4,8; 1-st & 3-rd bl.: 2,5,8;

2-nd & 3-rd bl.: 3,6,8; 1-st, 2-nd & 3-rd bl.: 7,8.

This time there is no danger of the two wefts being twisted around each other. Both wefts should be of the same count, but the pattern weft should be softer than the ground.

Third method. As far as the treadling is concerned, it is exactly the same as the Second method. But now we are using three shuttles: one for the pattern, one for the ground which follows the pattern, and one for the ground on treadle 8. The first two carry weft of about the same count, but the last has a very fine weft: much finer than the warp. Thus the shots of pattern come much closer to each other.

The only difficulty with this last method is that to get good selvages we must be very careful how we cross the shuttles at the

NET WEAVES

WHIP NET

This time we shall concentrate on details. If you have tried already the methods suggested in the last issue, you must have noticed that working with doups is not as easy as in the case of plain gauze. This is because a doup must go around three warp ends instead of one.

The loom is set up as for Gauze with standards or without them, but since we need only three shafts, we might as well use the remaining one for standards. We must remind here that the advantage of having standards is that the doups do not tangle in the shed. Otherwise there is no difference, and the size of the shed is the same in both cases. The draft is as follows:

	X	X	X	X	X	X	0	0	plain heddles
	X	X	X	X	X	X	0	0	plain heddles
	o	o	o	o	o	o	0	0	gauze doups
	X	X	X	X	X	X	0	0	standard heddles
reed:	-	-	-	-	-	-	3	2, 1	
	0	0	0	0	0	0			net heddles

Treadling: tabby - 1,2; gauze - 2,3; whip net - 2, net doups.

As we can see from this draft we can (theoretically) weave tabby, gauze, and whip net, and we shall do it when experimenting. In practice it is hardly worth while to try tabby or gauze alone on this set-up, because the shed 2 used in all cases is rather difficult to open. It is of course as difficult when weaving net, but then the reward is that nets have very few picks per inch and the weaving is comparatively fast. Thus for net weaving we do not need treadles 1 and 3, but they come handy when we make experiments, and when we combine net and gauze in the same fabric.

Now to start from the beginning: the warp should be threaded as for gauze and the tie-up adjusted first of all. The ties in the tie-up are all for sinking sheds, but they are not all of the same length. Only experiment will show how long each of them must be. Then a jack-type loom is out of the question. It must be a counterbalanced one with a shed-regulator, or a double-tie-up one. In any case "o"

in the tie-up means always a sinking shed, and all doups are hung from above.

When the loom is ready for weaving gauze, i.e. the warp threaded, sleyed, and tied-in, the tie-up adjusted etc., we make the net doups in front of the batten. It is easier to tie a doup around a warp end, than to make the doups first and then to thread the warp for the second time. The exact length of the Net doups does not matter. They may be of the same size as the Gauze doups or much longer. The right kind of thread or yarn is very important. It must be strong but very pliable. We may suggest mercerized cotton, hard twist No. 20/2, or sewing thread of about the same weight.

All doups must be of exactly the same length, and they are all tied to a stick or rod slightly longer than the width of warp. Instead of making individual doups, we can use a continuous thread going under a warp end, then over the rod, under the next warp end, and over the rod again.

We shift the Net doups back to about two inches from the batten, at the same time pressing lightly treadle 1. Then we release the treadle and lift the doup stick as high as it will go. This will open a small shed which must be enlarged with a picking stick if we use a shuttle. For rigid weft there is no necessity of enlarging the shed. And this is our first Net shed.

The second shed is a headache! We press on treadle 2, and nothing happens. This is because the Net doups must go around 3 warp ends, and they won't do it of their own accord. To help them we pass the tip of a finger (or the tip of the picking stick) across the warp just below the doups several times there and back. The shed slowly opens. If we do it long enough the shed may open to its full size, but it is easier to stop as soon as we can pass the picking stick through the shed. Then proceed as usual, i.e. turn the stick on edge and throw the shuttle.

Another difficulty in this type of weaving is the terrific take-up in weft. If we try to make a very open Net (and all Nets are very open) and we stretch it along the warp to get a good shed, the fabric will shrink to practically nothing in width after a short time. Thus we must use templets (stretchers). Even with rigid weft there is quite a lot of pulling-in at the edges.

We shall write soon about the templets; it is a chapter of the weaving lore which has been neglected for a long while.

. From the fact that we need only one treadle to weave the Whip Net, and that shafts 1,2, and 3 are tied to this treadle, one should not jump to the conclusion that the whole weaving could be done on two shafts plus Net doups. This is only a theoretical possibility, because there should be a certain dis/tance between shafts 1,2 and 3,4, and the larger this distance the better. Thus if we have an 8 shaft loom, we should use shafts 1, and 2 for standards and doups, and shafts 7 and 8 for tabby. But it is true that Net alone can be woven on a primitive loom. We shall come back to this subject.

Considering all these difficulties we are of the opinion that it would not do any good, if we rushed with further information about more complicated Net Weaves. We shall soncentrate on the Whip Net and its variations for a while.

TERMINOLOGY .

One of the reasons why we have published our "Encyclopaedia of Handweaving" is the utter confusion of weaving terms in different parts of the English speaking world. But this confusion is at least limited to the handweavers. But what happens when an outsider starts writing about weaving simply defies description. We have at hand several books about the history of weaving written by presumably professional historians. We find there: "laze rods" instead of lease rods, "shed rods" (one more expression for shaft), "rod heddle" (same thing), "beater-in" (batten), "women's handgrip loom" (tapestry loom), "warp-spacer" (raddle), "sword" (batten). In at least one case the weft for no reason at all is called "warp", and the warp: "pseudo-warp", when the pile in warp is "weft". We have also "heddle-leashes of spiral form" (doups) - obviously the scientist who wrote this forgot his high school geometry. "Warp lifter" is another term for picking stick. "Counter shed" will remain a mystery, but it is a part of "Fipa" loom, and obviously anything can happen in a fipa loom. We may also learn that in Mortlake (?) there were "quasi weavers" who developed their own "Quasi Weavers' Comb" (tapestry fork). Probably the longest term to designate a heddle is "cord-heddle-for-raising-pattern-warp", and the shortest for a blade in a reed: "slat". But the poor historians could retort that after all in one of the quite recent catalogs of weaving supplies a batten was listed as a "bottom beater", and one feels that this piece of equipment we need very badly.

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