

MASTER WEAVER

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No. 1

HOW NOT TO WEAVE LINEN

First of all let's limit our subject to single linen both for weft and warp. If we can weave single linen we shall have no difficulty in weaving two or three-ply one. On the other hand single linen is the one which gives the best results, and which looks like real linen, when the other kind although easier to weave looks very much like cotton, or even rayon when it is mercerized.

The reason is very simple: single linen yarn flattens and spreads when ironed for the first time, filling the spaces between the threads, and thus giving an even, glossy and soft texture hard to imitate in any other medium. When two or more strands are twisted together, they cannot be flattened since part way they lie one on top of the other. The more plies and the harder the twist - the poorer the yarn from our point of view.

What are then the principal difficulties encountered in weaving single linen? The trouble seems to be that most weavers try to weave linen as if it were wool, or cotton, and this is why we put more stress on the negative aspect of this problem. It is really more important to avoid certain mistakes in handling linen, than to stick to any particular set of rules and prescriptions. We might say that to weave linen one has to know how not to weave it.

The best proof that linen (always single) is not more difficult to work with than any other yarn, is that the beginners if started on a single-linen warp have no more trouble with it than let's say with wool. On the other hand weavers of long standing but used rather to cotton and wool, have unending difficulties with the same warp.

The physical properties of linen are not only different but often diametrically opposed to the properties of wool and similar yarns. First: linen is not elastic. Second: linen does not stand friction. Otherwise it is a very strong yarn as you will notice if you try to break a 10 lea in your fingers. There is one more property of less importance and rather working to our advantage: when stretched it does not break immediately, but stays stretched. This makes linen one of the best wefts, since it has no tendency to draw the edges in.

These factors outline the whole technique of handling linen, which can be condensed into one short principle: avoid stretching and rubbing it.

Although the directions for handling linen seem to be so simple - just watch out for friction and tension - they must be

carefully observed through all weaving operations. We shall take them now one by one in the chronological order.

1. Warping. Warp directly from tubes or skeins (better avoid skeins though) without rewinding on bobbins. If the outer

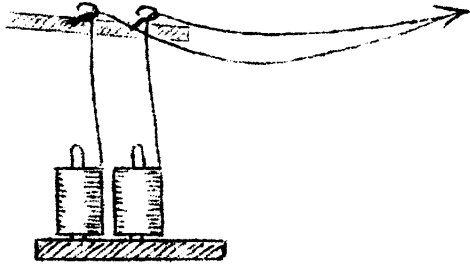


Fig.1

layer of yarn on a tube is worn out better ~~save~~ save the first ounce or so for weft. The tubes can be placed on a bobbin rack, but the warping will be faster if they are set vertically in a simple stand on the floor. Two screw-eyes should be fixed in a bench or table directly above the stand (fig.1). That is if you warp two ends at a time, which is probably the easiest. If you have four or more,

you will need more pegs in the stand and more screw-eyes in the bench. Each thread goes from the tube through the proper screw-eye to the warping reel or frame.

Either warping frame, or horizontal warping reel should be used. A frame is better for short warps up to 12 yds. In either case there should be no tension on the warp - let the yarn slide through your hand without the slightest friction. The hand should be quite dry - if not, use a smooth leather glove (not chamois!). It is still better to work with a metal hook (fig.2)



Fig.2

and not to touch the yarn at all. The hook can be made of copper tubing or wire not less than $\frac{1}{4}$ " in diameter, and must be kept clean and polished. It takes quite a while before one gets used to handle it properly.

2. Beaming. The finished warp is not chained. If you can place the reel or the frame right in front of the loom, secure the lease and unwind only enough of the warp to reach the back of your loom. There put the lease-rods in place and tie them to the loom frame between the harness and the slabstock (the harness has been lowered down of course), spread the warp using an open raddle, and attach it to the apron. Now ask your helper to stand as far as possible from the loom, but directly in front (if the reel is in the way move it to one side) holding one half of the warp in each hand. The warp should be held just as it comes from the reel or frame. The different ends or whole strands of warp will have different length and tension between the helper and the loom, due to the disarrangement of the warp during the operations of spreading and tying to the apron. This can be corrected by shaking and jerking the warp as a whole, but not by pulling at individual ends. If the warping itself has been properly done all ends should have now a uniform tension, and the beaming proper can start.

When beaming insert sheets of heavy paper between layers of warp, or still better have one continuous length of paper for the whole job. Not impregnated building paper is excellent for looms not exceeding 36" in width. When working with sheets overlap

them by 2 inches or more. The layers of warp must be separated because the warp will be tightened before or during the early stages of weaving, and should two layers slide over each other, the resulting friction may ruin the warp. For the same reason (avoiding friction) we do not thread and slay the loom before beaming.

The lease-rods are left in the lease. They can be removed if crosses are made on both ends of the warp - they are inserted in the second cross after beaming, then. In the first case the beaming is slightly slower, in the second however some trouble with warp (twisted ends) may be experienced in weaving.

The tension of warp during beaming is rather low, and the turning-on should be as fast as practicable. Linen ends do not break without warning. The first warning are twisted ends which do not separate but at the first rod. The second warning are bent lease-rods, which should be thin and pliable just for this purpose. The weaver who turns the beam should keep under observation the lease all the time, and stop at the first sign of trouble. Untwist the faulty ends by inserting a comb or any smooth object between them, and push the twist gently backwards.

The helper walks with the warp toward the loom - never lets it slide through the hands. When one length of warp is thus beamed the whole operation starts from the beginning, and so on, until the whole warp is beamed.

But the beaming does not always go as smoothly as that. Sometimes without anybody's fault the ends keep twisting or sticking to each other. The simplest remedy then is to stop and to comb the warp from the loom toward the helper. The combing must be done in one long stroke. Repeated short strokes do not help and wear the yarn out. A long, open, and very smooth comb should be used. If this does not help it means that the warping was not perfect, which again is not necessarily the weaver's fault. As a rule all warping reels and frames are too small to give perfect results. Whenever in warping two strands of warp are piled one on top of the other, the second strand is obviously longer than the first, and the warp will not have a uniform tension. This is of no importance with such yarns as wool, where the elasticity takes care of the difference in tension, but since linen is not elastic, a warp end which is even slightly longer than the others, will stay so until something is done about it.

So if it is noticed that a part of the warp is sagging when the rest of it is tight - there is nothing to do but to equalise the tension by pulling at the offending parts of the warp until the whole has the same tension. This process must be repeated every time the helper starts a new length of warp to be beamed. It is evident now why the helper should stand as far from the loom as possible. If this distance is for instance 6 yds and the warp 24 yds long, the beaming will be done in four stages, but the shorter it is the more often the whole straightening process must be repeated, and the more will the warp suffer. This is why warps longer than 30 yards are not very suitable for an ordinary equipment. Warping mills overcome to a certain degree this difficulty but they are too bulky for most of the handweavers.

With wide and closely set warps the difference in length of individual ends combined with the tendency to twist and stick may be difficult to overcome. Then the following technique never fails although it is rather slow. Untie the lease-rods from the loom frame, and move them through the warp towards the helper. If they get stuck it can be easily found out why, and the corresponding part of the warp straightened out. Then beam until the lease comes to the slabstock, and start all over again.

Whichever method is used we have to remember that to correct the difference in length we have to pull the offending ends, and never to use the comb for this purpose. The comb may be used only when all ends have the same length (and consequently tension) to separate these which are either twisted or stuck together.

Under ordinary circumstances a warp of 500 ends should be beamed at a rate of about one yard per minute.

3. Threading and slaying. There is nothing special about threading linen except that it is advisable to perform both threading and slaying in one operation. However this is not necessary by any means.

4. Gating (adjusting the loom). The lease-rods should be left in place about 6 to 8 inches back from the harness. This will give both front and back sheds of about the same size and consequently the minimum of friction between the warp and the heddles.

The harness should be hung so that the lower portion of an open shed be just slightly tighter than the upper one, but not much tighter, or the upper part will sag, again due to the lack of elasticity.

The batten must be rather heavy and so adjusted that neither the lower nor the upper shaft of the reed will touch the warp when a shed is opened.

The loom itself must have some arrangement for fine adjusting of warp tension: either a ratchet wheel with fine teeth, or better - a friction brake.

Shuttles and bobbins may be of any kind on one condition: that the wefts unwind smoothly but not too freely from the shuttle. If the shuttle has nothing to brake the bobbin with, we can wind a piece of yarn around the spindle to increase the friction. A piece of fur glued inside the shuttle and just touching the bobbin may work as well. The winding of bobbins is as important here as in any kind of weaving.

4. Weaving. The tension of warp during weaving should be as low as compatible with a clear shed. Do not try to improve the edges by increasing the tension - not at first at any rate. This tension should be not only low, but always the same. It may be difficult to maintain it with a ratchet wheel brake, but it has to be kept steady. It is much simpler with a friction brake: we start with a too high tension, and then gently release the brake until it gets just right (check on an open shed). After weaving an inch or so the brake must be released again because weaving takes up some of the length of the warp.

The fell (last pick of weft) should be never farther from the harness than 8 inches, nearer if possible. Do not weave more than two inches at a time, move the warp forwards often.

Beat only once, but beat hard - linen can stand it.

Beating should be done without pressing, only by the weight and speed of the batten. One swift stroke will do more than protracted pressing, and is much easier on the yarn, requires less effort, and takes less time. Beating and treadling should be so synchronised that at the moment when the batten starts moving forwards, the shed begins to close; when the batten touches the cloth the shed is closed, and by the time the batten returns to its original position, the next shed is already opened.

Provided that the warping and beaming were properly done ^{are} there only two difficulties likely to occur in weaving: broken ends, and uneven edges. Here are the remedies.

Ends break at the edges. Before they do, the edges become fluffy - thus giving us a fair warning. Release the brake on the shuttle, if any. Do not beat until until the hand moving the shuttle away from the reed has stopped, thus releasing the tension on the weft. Decrease the tension of the warp.

Ends break in the middle. This happens when the shuttle strikes an end hanging loosely in the shed. Clear the shed by adjusting the harness, the tie-up, and the tension.

Edges uneven with loops and notches. The fault is nearly always with the shuttle, the bobbin, or the way it is wound. Every notch means that the weft caught in the shuttle. Braking the bobbin with your thumb should be avoided - it is never satisfactory when weaving fast. If loops of weft appear regularly on both sides the tension of weft should be increased. One way of doing it is to beat early - when the shuttle is still in motion.

Unweaving is hard on linen and usually it leaves a mark, so it is advisable not to make mistakes. But if necessary it can be done in the following way: increase the tension of the warp, open the shed as wide as possible, release the weft by pulling it up gently with your fingers, make sure that the weft does not stick to the warp (particularly at the edges) and only then throw the shuttle.

As a rule there is no need to use a size, but there are exceptions. When the weave has a tendency to draw-in the edges (twills and pattern weaves without binder), or any yarn other than linen is used for weft, we may have broken ends at the edges even with a very low warp tension. Then some kind of sizing is indicated. Probably the best and the least messy is pure paraffin wax. It may be rubbed into the edges right on the loom, or if trouble is expected in advance, the warp may be impregnated with the same wax dissolved in gasolene. It increases the resistance of linen nearly ten times, when water - only twice.

As a final remark we may say that all the precautions described above are really needed when one starts to work with single linen. Later on some of them can be dispensed with, at least to a certain degree, but only long experience will teach us how far we can go disregarding the rules, without getting into trouble.

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