## MASIER WEAVER

BI-MONTHLY BULLETIN FOR HANDWEAVERS



FULFORD · QUEBEC · CANADA

# ENCYCLOPEDIA OF HAND-WEAVING

### IN ALPHABETICAL ORDER

The Encyclopedia contains weaving terms used in the United States as well as in the British Commonwealth. It can serve either as a reference book, or as a handbook of handweaving. Its main purpose is to enable the weaver to read and understand any weaving publication, book, or periodical regardless of its technical level.

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## / ASTER WEAVER

#### Z - H A N D I C R A F T S · F U L F O R D · Q U E B E C · C A N A D A

December, 1951

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.

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

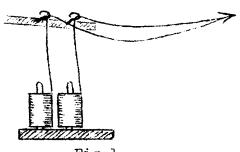


Fig.1

layer of yarn on a tube is worn out better save 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 heed 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.

Fither 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)

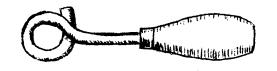


Fig. 2

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 <u>must</u> 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 teaming 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 stuch 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.

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 unwinds 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.

are Provided that the warping and beaming were properly done 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.

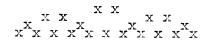
Ends break in the middle. This happens when the shuttle strikes an end hanging loosely in the shed. Clear the shed by adjusting the harness, the tie-up, and the tension.

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. Eraking 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 wift 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.



The group of weaves known under the name of "Spot" contains several variations which at the first sight have little in common with each other, and nothing "spotty" in their appearance.

The earliest spot-weaves were woven as swivel, and usually had rather a large number of small patterns in one colour uniformly distributed on a plain background of a different colour. Here the name of spots was quite justified. When the number and size of spots increased so that they formed a solid pattern, the weave was called "All-Over Spots" which seems to be a contradiction in itself. Further development produced derivates which had spots but of the same colour as the ground, and eventually no spots at all.

The only characteristic common to all spot-weaves is that a part of the warp is used exclusively to weave the ground, when the other part produces the pattern. The first obvious conclusion from this peculiarity of spot-weaves is that they always have more frames in the harness than blocks in the pattern. Thus single spot weave has one extra frame reserved for the ground, double spot-weave - two frames, triple - three frames. Theoretically there can be "quadruple" and "quintuple" spot-weaves, but they are little used if at all.

As we mentioned above, swivel weave was the earliest and incidentally the simplest of all spot-weaves. Strangely enough however it has been nearly completely forgotten, when other derivative weaves survived under different names to this day. Thus we shall start our survey of spot-weaves with swivel.

Frankly, we do not know when and where the term "swivel" originated. Small shuttles such as might have been used in this technique were occasionally called swivels. Perhaps here is the connection.

The principle of swivel weave is just the opposite to overshot. The floats do not form the pattern, but are either hidden on the back of the fabric, or cut off. The part of the pattern weft which tabbies with the ground (of secondary importance in overshot) is the only one which shows in a finished piece of weaving. This effect can be produced in a number of ways. Here is one:

Four different small patterns can be woven:  $m_m^m$ ,  $m_m^m$ ,  $m_m^m$ ,  $m_m^m$ ,  $m_m^m$ , and other not symmetrical variations.

Treadling for the first pattern will be: 5,4 (tabby) as many times as needed, then 5,4,2 - 4 times, 5,4,3 - 4 times, 5,4,2 - 4 times, and again 5,4 until the next pattern. Ground weft on treadles 5 and 4, pattern weft - on 1, 2 and 3.

This way of treadling is best when the floats are going to be cut off, so that the fabric will look the same on both sides. If floats can be left on the back, another tie-up and

treadling may give better results (the same draft and the same pattern):

0000 tr.: tabby - 5, 6. pattern: 3,4,6 - 4 times 1,2,6 - 4 times, 3,4,6 - 4 times, etc.

1,3 - pattern weft, 2,4,5,6 - ground weft.

Here only one shot of tabby is used after each shot of pattern. This is because treadles 1 and 2, and then 3 and 4 give already a full tabby shed. The floats may be cut on the back of the fabric, but not very close  $(\frac{1}{4}H$  or so).

Drafts for larger number of blocks are written in

The tie-ups however should be adapted to the pattern. For instance if we select a small letter "S" to be woven on the above druft, the standard tie-up would require simultaneous action of four treadles, which is rather hard on the weaver. An improved tie-up will have one treadle for each block:

pattern: mm m tie-up: 000 0 tr.: 2,5,6 - 4x, 3,5,6 - 4x, 1,5,6 - 4x, 1,5,6 - 4x. 3,5,6 - 4x. 3,5,6 - 4x. 4,5,6 - 4x. 3,5,6 - 4x. 4,5,6 - 4x. 654321 pattern weft on 1,2,3 and 4.

The patterns should be rather large and not too involved. Cutting off floats from an intricate pattern is a long and exacting job. The smallest component of any pattern should be at least 8 warp ends long. If it is any shorter it does not show well, and it may be easily damaged. Some of the colonial motives such as Slates, Snowballs, and Trees can be easily reproduced in swivel.

Since swivel weave has no units in the proper meaning of this word, short drafts may be written in the same way as for overshot. E.g.: 8128128 10810 8128128 30 60 60 30

where the first line corresponds to frames 1 and 2, second - to 1 and 3, third - to 1 and 4, etc. An alternate method consists on counting ends on pattern frames only. To indicate that this particular method hes been used we underline the draft with one heavy line corresponding to the first heddle-frame:

15<sup>46</sup>4<sup>6</sup>4<sup>30</sup>54<sup>5</sup>30<sup>46</sup>4<sup>6</sup>4

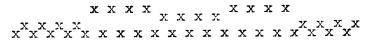
This way of writing short drafts is probably the best, since it can be used directly for threading. Profiles are toolong if drawn full size. On the other hand they are very usefull when exploring the possibilities of a pattern. Consequently they must be cut down to a fraction of their original size (compare the article about variations of pattern in the same issue).

Swivel can be woven on drafts more suitable for counter-balanced looms. As a matter of fact it can be woven on nearly any draft which has a tabby shed, and a rather large pattern, but this kind of "pseudo swivel" does not belong to the Spot family, and we shall discuss it later.

The technical requirements of swivel weave are few. The warp is set closely, and the weft beaten firmly enough to obtain a 50:50 tabby. The pattern weft should be slightly heavier than the ground but not much heavier or the pattern will be distorted. The colours selected for the pattern must be dark or rather striking to show at all. The floats are cut after weaving about  $\frac{1}{2}$  from the fabric. After ironing and laundering they are cut again with very sharp scissors as close to the fabric as possible.

The only difficulty in weaving is the tendency of the ground and pattern wefts to twist together when they come into the same shed. It helps when the tension of both upper and lower part of the shed is exactly the same, when the shed is not opened too wide, and when the weft is soft and not too slippery.

Swivel with cut floats may be used for table linen, towels, scarfs, curtains, and even dresses. Floats should be left uncut for upholstery and cushion covers.



#### WHY DO WE WEAVE?

In our era of mechanised civilisation, hobbies based on more or less ancient crafts seem rather incogruous. We have such modern pastimes as photography, radio, telescope building, miniature railway, which are all in touch with the latest progress of science and go step in step with the march of time. How then can we explain that quite a large part of humanity takes delight in walking just in the opposite direction? In producing unnecessary goods in the most primitive and hard way? calling relaxation exactly the same occupation which was called hard work two or three centuries ago?

The answer to these questions is neither obvious, nor simple. The two following factors are usually given as an explanation. First that our emotional life develops or rather changes at a much slower rate than our intellectual life, which created the present Western civilisation. Emotionally we are neither adapted to, nor satisfied with our modern way of life, particularly with its speed and its superficiality. Emotionally we are much more attached to the past, than we realise. And crafts take us back to this past, to a deliberate and harmonious way of floing things, without any regard to the time involved, without a thought about The second factor is connected with the fact that in efficiency. most cases our work, such as performed in a civilised society, presents but a small fragment of the complex process of production. Whether it is publishing, or making refrigerateors, baking bread or even defending the country - the work of one man is so intricately interwoven with the work of others, that in itself it does not seem to make sense. Thus the worker is constantly frustrated, has no sense of achievement, and no pride in looking at the finished product. Now, how it all changes when he turns to crafts. He is performing the whole miracle of creating things all by himself, he develops a sense of responsibility since there is nobody to blame when he fails, but he takes all credit for success also. He is

often admired by his environment, and perhaps can even sell a few things, which removes all doubts about the value of his production.

Whether this explanation is **ri**ght or wrong, we feel that there is more to it, and that these two factors are not the only ones.

It would be interesting to learn what is the opinion of other weavers on this rather controversial subject. Please write us, and we shall print some of your letters in the following issues, particularly these which present a different approach to the problem.

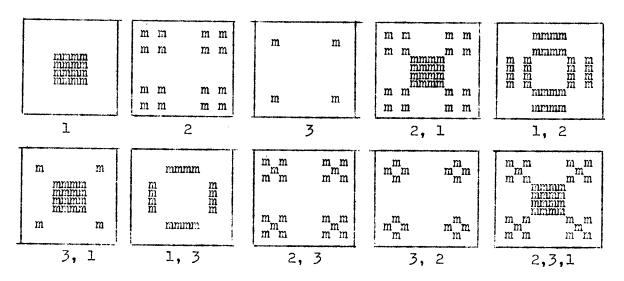
#### VARIATIONS OF FOUR BLOCK PATTERNS

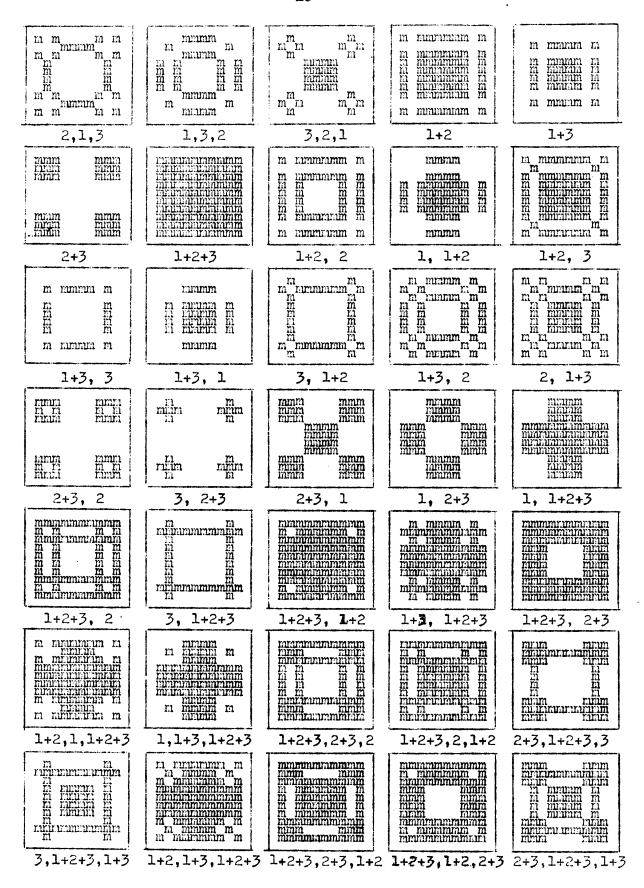
Those familiar with heigher mathematics and particularly with permutations, can find the number of possible variations of any pattern from formulas. Those who are not, can only try to square all possible combinations of blocks. This is a tedious task, but gives us not only the number of all variations, but their appearance as well. Not to miss anything we proceed in a systematic way starting with single blocks, then pairs, and so on. The final result is often unexpected. For instance with patterns of 3 blocks plus ground which may be considered as a fourth block, not less than 64 square (i.e. symmetrical) patterns can be obtained. This means that on 5 frames 64 patterns may be woven from the same threading in Swivel or lace. Summer-and-Winter will require 6 frames for the same number of variations, and dimity (turned 1:2 twill) - 12 frames.

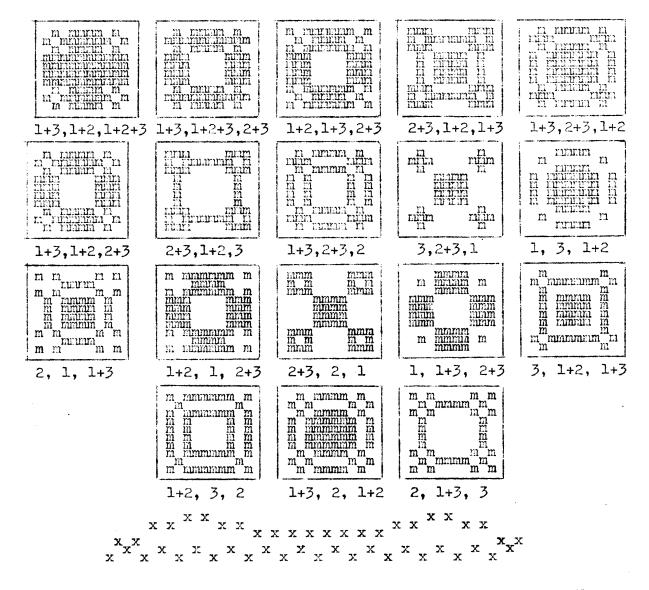
Here is an example of such a four-block pattern. In the profile the lowest line is ground, then come pattern blocks numbered 1,2 and 3:

$$m^{m} m_{mmmm} m^{m} m \frac{3}{1} G$$

Each variation is marked with the number of blocks used. Thus: 2,1,3 means that all three blocks were used in the order indicated; 2+1 means that these two blocks were combined into one, and so on.







#### NOTES ON WEAVING TERMINOLOGY

(from the "Encyclopedia of Hand-Weaving")

HARNESS - (fr.Fr. "harnais" = set of heddle-frames, or leaves)
Originally the word designated all heddle frames with the upper
tie-up i.e. with rollers, pulleys, or horses, and all connecting
cords. It is still used in this meaning in Britain.

In the Untited States the word "harness" acquired quite a different meaning, and designates a single heddle-frame (leaf). This change took place probably towards the end of the last century. Even in books printed as late as 1918, the word "harness" is used in its present meaning only occasionally. The mistake occured most probably when interpreting old drafts marked:

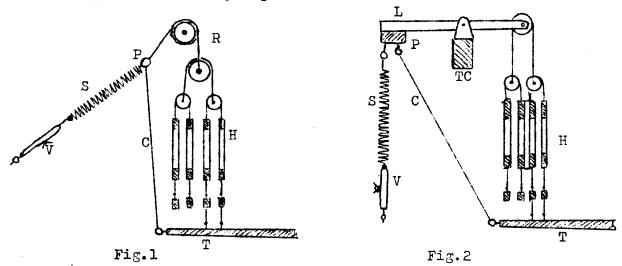
"4" harness" equivalent to "4 leaf harness".

The synonyms for our wrongly used "harness" are: heddle-frame (artificial but clear), or just "frame", "shaft" used in commercial weaving, "leaf" (obsolete), "heald" - in English handweaving, and such ambiguous terms as: heddle-stick, shed stick, and Leash Rod (not Lease Rod). In our articles we shall use the term: Heddle-frame, or just Frame, but it would be rather logical if we could return to the old "leaf". Please, comments!

#### SHED REGULATORS ON COUNTERBALANCED LOOMS

The merits of CB looms are unquestionable. They give a positive shed (opening in two directions) with a minimum of effort, and from this point of view can be only compared with double-tie-up jack-looms, but they are simpler to handle. Unfortunately they work well on balanced tie-ups only. On all other tie-ups the shed opens too high or too low, thus making the weaving hardly possible particularly with linen. To overcome this difficulty we have designed so called "shed regulators" which bring any shed to the proper position. They are simple and inexpensive to make, but they work well only with a small number of frames.

If a shed opens too low, the harness should be raised. When the shed opens too high, the harness should be lowered. Let's the hang the whole harness (H,fig.l) on an additional roller (R) and regulate the position of the harness with a cord (C) which extends from the tip of the treadle (T) to a horizontal piece of wood (P) connected with the harness over the top roller. To balance the weight of the harness, springs (S) are used. These are ordinary screen door springs.



If the harness is hung from a top-castle (heddle-bearer), the shed-regulator consists of two levers (L,fig.2) propped on the top-castle (TC) and joined at the back with a transversal piece (P). The front ends of the levers support the harness, the back ones are connected with the treadles.

The cords C must be easily adjustable, since their length regulates the position of the shed; when the shed opens too high the cord should be made longer and vice versa. To get a smooth performance, we must have the tension of the springs adjustable, too. This is done with a short cord (V) which ties the spring to the loom frame. The shorter this cord the greater the tension and the higher will the harness hang in the neutral position. The cords C pass among the warp ends, and they should go in a nearly vertical direction, so as not to rub against the warp. They are tied only after the warp is threaded and tied-in.

