

The background of the cover is a collage of various weaving-related documents. It includes several grid-based charts with intricate patterns, some with handwritten notes in Finnish. One note at the top left reads "6-755 6-756 6-757 6-758 6-759 6-760 6-761 6-762 6-763". Another note at the top center says "loimi- ja kudel- mallia pomsia yhdistetty." There are also technical diagrams with labels like "Thread from A", "Thread from B", "Thread from C", "Thread from D", and "Thread from E". A diagram in the middle shows "Threads 880" and "720" with "White material 12". A diagram at the bottom right shows "Olkensuunnitelma" and "Tuloste". A diagram at the bottom left shows "3-752 K".

# MASTER WEAVER

**BI-MONTHLY BULLETIN  
FOR HANDWEAVERS**



**Z-HANDICRAFTS  
FULFORD, QUE., CANADA**

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## THE STORY

### OF THE TECHNOLOGY OF HANDWEAVING.

It is a fact that handweaving is much older than what we call history, and therefore that we have only a faint notion of how and when it started.

It is nearly certain that weaving originated independently in different parts of our globe and at very different times. Once it reaches a certain level it spreads rapidly in all directions. The result is that we cannot study the history of weaving of one geographical district without taking into account what was happening in the neighbourhood, sometimes very remote.

Thus an island in the Pacific could remain at a very primitive stage for a very long time, and then suddenly because of an invasion or new trade relations the weaving technique will improve, and the designing change. If the two civilisations brought in contact are not too widely different the influence may be mutual. Then again for centuries nothing happens, until a third civilisation in some way stronger than the first two leaves its mark permanent or transitory. And so it goes.

But it also happens that from time to time we find very primitive civilisations which apparently were never influenced by anything. Thus the first white explorers in Australia found aborigines who did not yet invent the spindle - thus the two races were separated culturally by some ten or twenty thousand years!

This highly accidental pattern of development explains why even at the beginning of this century we could find nearly all stages of weaving in one country or another.

If we wanted to describe the history of weaving in all inhabited parts of our globe, we could not do it in less than a number of volumes, that is if we had all the data necessary for such a tremendous work, which we have not.

What we can do however is to follow the growth of a fictitious, yet average civilisation; and this is what we shall do.

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What comes first: spinning, weaving, sewing, basketry, or mat plaiting? It seems obvious to us that spinning must precede weaving, because if we have no yarn we can not weave. But this is not necessarily true. We might as well say that there is no sewing unless we have the thread. But again this is false.

Probably the oldest crafts of this class are: sewing and basketry. Which of them is the oldest depends on location. Sewing with animal sinews could be done anywhere from the poles to the equator. Basketry only in places with higher vegetation (willows, rushes). But surely mat plaiting should develop parallel to basketry.

Thus sewing was if not the first, the most universal craft. How long ago was that, we can not even start guessing. Twenty, fifty thousand years? Then came baskets and mats, the latter as a sort of a luxury.

Mats when finished may be considered as woven, except that no weaving implements were used, and that there was hardly any difference between the warp and weft. But obviously mat-making is already the first step toward weaving.

The weaving proper starts when there is a distinction between warp and weft. The warp is stretched between two points, such as a bough, or a trunk - and the weaver's belt, or a strap at the weaver's back. Then the weft is inserted into the warp with a pick-up stick (a primitive needle). To keep the warp stretched to the proper width we have at first a raddle at the back of the warp. Then a raddle, which at the same time is a reed - closer to the weaver. The beating of the weft is done with a fiat stick.

Even now spinning does not come into the picture. There are all sorts of long vegetable fibers, and animal sinews, leather thongs, etc, which can be used for primitive weaving. In at least one instance we have weaving which uses higher techniques such as

a pile on plain ground without any trace of the knowledge of spinning.

The lease rods or at least one of them appear very early in the history of weaving, and the next development is a heddle-stick: a stick with half-heddles (doups) which can open one tabby shed, when the other shed is produced by the lease rod or rods.

The raddle in front of the heddle-stick changes slowly into the reed held in a batten.

The shuttle is a much later development. At first it was a ball of yarn which followed a picking stick. Then the yarn was wound on a flat stick with two small balls (one on each end) to prevent slipping. Then came the flat shuttle with a notch at each end. Then the yarn wound around a horizontal spindle, sort of a long bobbin. This bobbin was later on placed in a small box, and this is how our shuttle was invented.

The warp instead of being stretched between two points, was spread between two horizontal sticks, or was hung from one stick and weighted with stones etc on the other end. The stick or sticks were fixed to perpendicular supports to form a frame vertical or horizontal. Finally both horizontal components were replaced by rollers which could hold any length of warp and any length of fabric.

The later stages consisted on mechanised shedding-motion (shafts, treadles) and on ever increasing number of shafts.

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This is the ideal scheme of the growth of the technology of handweaving. It probably never took place actually in the above order in any single country. In many cases it stopped either at the lowest level (point to point warp, narrow fabrics), or at the stage of a frame loom (horizontal, vertical, with or without rollers), or finally on the stage of simple foot-power loom (mostly four shaft, counterbalanced). It is remarkable that after reaching any of these levels the stagnation could last for more than ten centuries, to be followed by a very fast development always due to the influence of another civilisation. Only Asia, Europe, and quite recently North America went beyond the third stage of a simple foot-power loom. How this happened we shall see in the next instalment.

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# TURNED TWILLS.

## THE "D" CLASS: DIMITY, DIAPER, DORNICK, DAMASK.

When a twill forms a pattern of any number of blocks, but with only two kinds of blocks: one with vertical, and the other with horizontal floats, such a twill is called "turned". It may be woven on any number of shafts from 6 up; it may have a diagonal or not, but the blocks of pattern are rather large when compared for instance with diamond twill, and there is never any binder.

The twills are always of the type 1:N, for instance: 1:2, 1:3, 1:4, 1:5 etc. Theoretically any unbalanced twill could be used as well e.g.: 2:3, 2:4 etc., but there is no point in doing this, because the final effect depends on the ratio between warp and weft in each block and this is highest in a 1:N twill.

As a rule Turned Twills are woven as Broken i.e. without diagonal (this is by the way impossible with 1:2 twill), or with a simple diagonal which changes direction from block to block. Here again theoretically we could have a diagonal running in the same direction through all blocks, but the result would be far from being satisfactory. There is also a variation of Turned Twills with a small diamond pattern in the texture of each block; these should be called Turned Diamond Twills.

Thus even if we keep to the orthodox Turned Twills we have many variations quite independently from the pattern woven, and we shall start by classifying them:

Group A. Biased twills with a diagonal changing direction from block to block. Here we have the simplest twill of this class: Dimity, or 1:2 turned twill. Then comes 1:3 twill, or Diaper. But we must remember that the term "Diaper" may also mean any simple biased turned twill. Finally we have higher twills: 1:4, 1:5, 1:6, 1:7.

Group B. Either Broken Twills, or Satins. The simplest twill here is 1:3 and it is called Dornick Weave (not the same as Herringbone Dornick Twill), although sometimes the same term has been applied to biased 1:3 twill. The higher twills such as 1:4 to 1:15 are woven as Satins, and the weave is called Damask. As a courtesy title Damask may also be used to designate 1:3 broken turned twill.

In power weaving this "courtesy" becomes a habit, and nearly all cheap damasks are broken 1:3 twills.

Group C. Diamond Twills 1:2 or 1:3. Higher twills are seldom used, but there is no reason why they could not be. The whole problem evolves around the question whether it is advisable to have two patterns: one small, and one large in the same fabric. In so called "modern weaving" the answer would be: certainly not. Otherwise, since both patterns are rather faint, and since the small one does not interfere in any way with the main pattern (except for the difficulties in drafting), the combination is acceptable, and the general effect extremely professional.

We shall start with the first group:

A. Biased Turned Twills.

The simplest as stated before is 1:2 twill. It requires three shafts for each block of pattern, and the simplest patterns can be woven on 6 shafts as in fig.1. The diagonals in the two blocks are

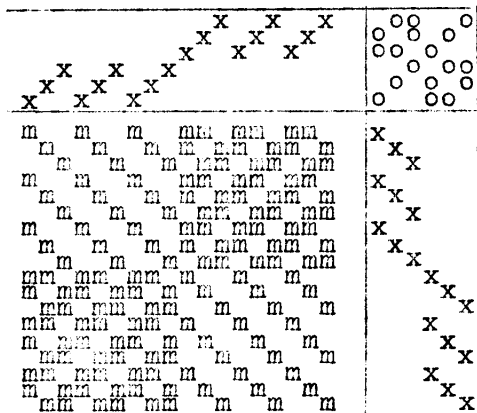


Fig.1

of an opposite direction. All floats are of 2. No float crosses the dividing line between the blocks. This last condition will be observed in all Turned Twills, and it requires a special attention in drafting.

For instance if we neglected it by adopting a different tie-up (fig.2), or tried to get the same direction of the diagonal

in both blocks (fig.3), we would get into trouble.

When a turned twill is properly designed, i.e. all floats are of the same length, and no floats cross the line between the blocks, such a twill is "cut", because "a cut" is the clear line which divides the blocks. The condition of its being clear is that all yarns in warp or weft cross from one side of the fabric to the other just at this line.

There may be cases particularly in multi-block patterns woven on a draw-loom, when we like better a blurred dividing line, and then

of course the principle of "cut" does not apply. But in any case it is not permitted to have floats longer than the standard float of the twill used: 2 for 1:2 twill, 3 for 1:3, 4 for 1:4 etc.

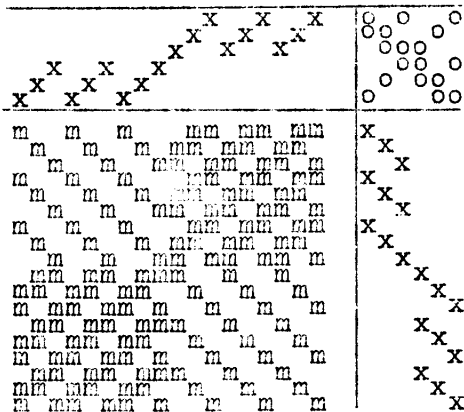


Fig.2

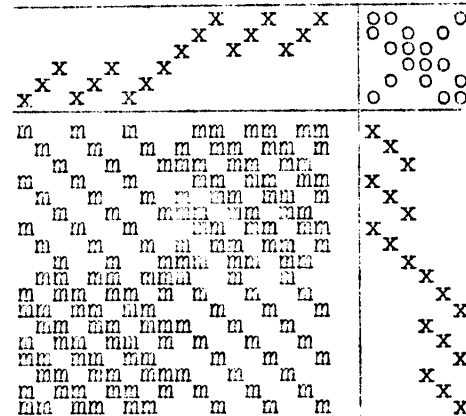


Fig.3

In the above examples we have been weaving either one block, or the other, but not two blocks at the same time. Combinations of blocks are quite easy provided that we have the proper tie-up and the required number of treadles. In the draft in fig.4 we shall weave all possible combinations i.e.: "no block"; 1-st block, 2-nd block, and both blocks.

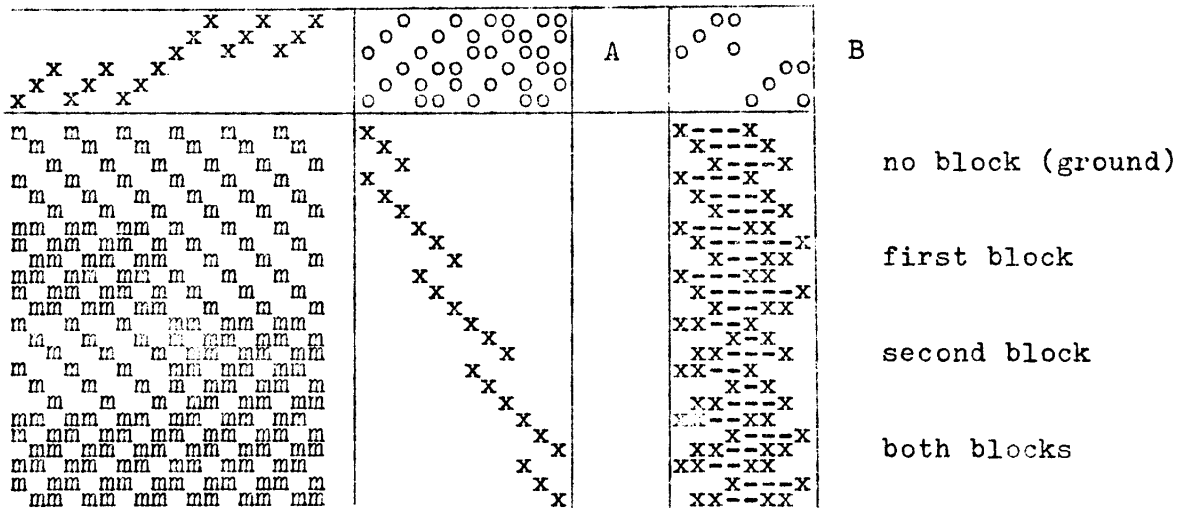


Fig.4

If we have 12 treadles all is well; then we use tie-up A. If not we must use a compound tie-up B, and press 2, 3, or even 4 treadles at the same time. However the treadles are arranged in such a way, that two of them can be pressed with one foot. This is very

inconvenient, but it is the only way, short of a Jacquard or doobby. A direct tie-up won't be of any use because treadles 1, 3, and 5 for instance can not be operated at the same time with two feet only. A small sample can be made on a table loom, but it will take time.

Even at this stage it becomes obvious that the main difficulty is the tie-up, and not the threading draft which is very simple in all cases, except in turned diamond twills. How then do we go about designing a tie-up?

We shall answer this question in the next issue.

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UNSYMMETRICAL HUCKABACK LACE

The number of small texture weaves even for four shafts is practically unlimited. Most of them can be easily recognised. Any classical pattern weave may be made into a texture weave simply by alternating two small blocks of the pattern. Overshot, crackle, summer-&-winter can be made in this way into texture (that is "no pattern" weave). Fig.1 gives examples of the three above weaves:

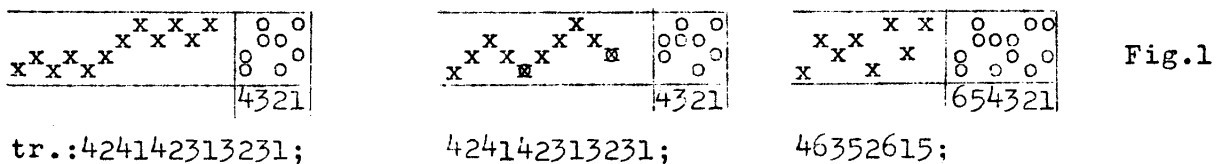


Fig.1

All three of them can be easily placed because of the threading tie-up and treadling, even if they do not produce any pattern.

But there are many cases when one hesitates how to call a particular draft. The threading may look like overshot, but the treadling is more like M's-&-O's, or the other way around. Ot the tie-up usually associated with huckaback is used with an overshot draft. What then?

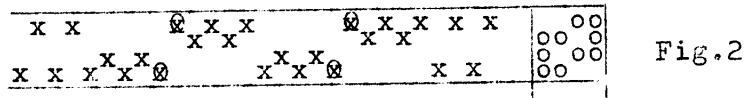
In many cases it does not matter too much what we call it. The weaves are not completely separated one from another. They often merge, and the "borderline" cases are difficult to diagnose.

Today we shall speak about such a case, where although the principle is simple, yet the fabric woven does not look too familiar.



This is the unsymmetrical huckaback.

Many weavers must have wondered at the numbers which designate all classical huckabacks: 6 x 6, 10 x 10, 14 x 14. What about 8 x 8, 12 x 12, or 16 x 16? Let us have a look at the traditional huck:



The length of one repeat both in threading and treadling is ten, and this is why we call it 10 x 10 huck. To make it into 8 x 8 we must eliminate 2 heddles from each repeat. These heddles are circled in fig.2. The new draft must be still a huckaback because we did not spoil the tabby order, and therefore we can use the same tie-up.

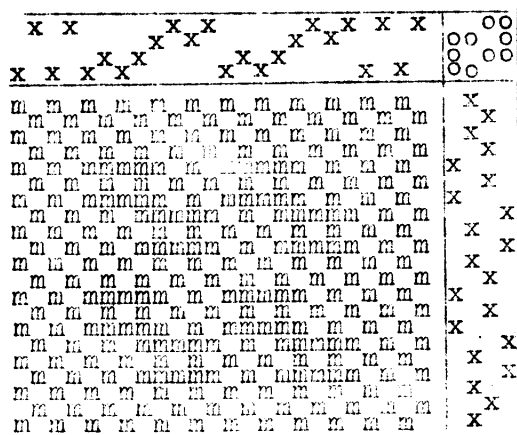


Fig.3

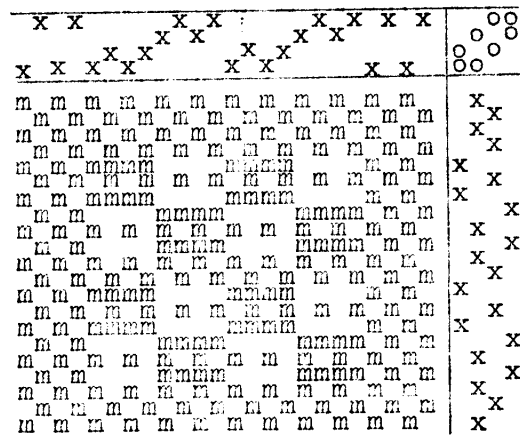


Fig.4

But this time it is an 8 x 8 huck. What we did in threading must be repeated in treadling since huck is positively a 50:50 weave. The result is not particularly encouraging. Turned huckaback (not shown) looks better but not very convincing. Finally we change the tie-up and make an experiment with huckaback lace (fig.4). This time we are getting something new.

It is new because the repeats in the draw-down do not follow each other as in a 6 x 6, or 10 x 10 huck lace, but are separated, and each seems to have a clockwise movement. The weave is balanced yet not symmetrical.

It seems then that we can change any huck lace (but not plain huck) into an unsymmetrical huck of a lower order simply by eliminating two heddles from the center of each repeat of threading, and two picks from each repeat of treadling.

Let us see now how this principle works with a 14 x 14 huck changed into 12 x 12 huck-lace. This is shown in fig.5:

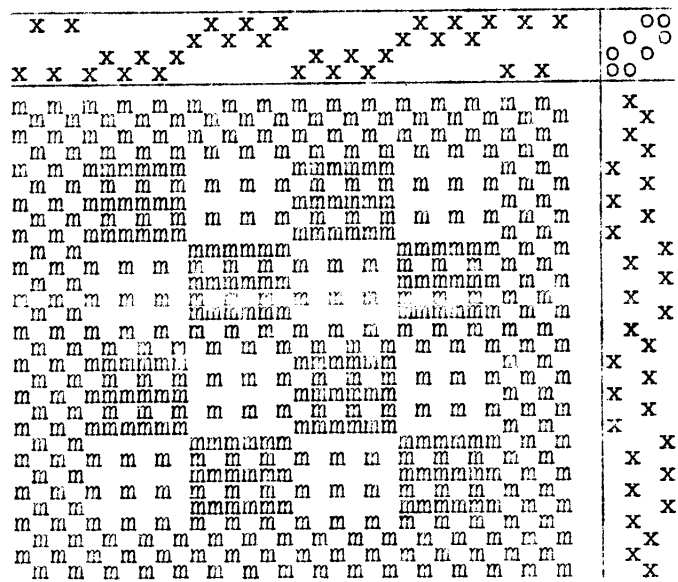
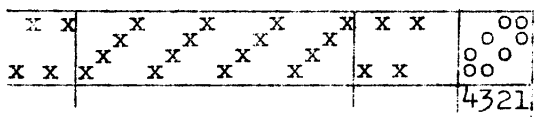


Fig.5

One may ask then: what about the 4 x 4 huck? Can it be done at all? The answer depends on our definition of huckaback. The draft in fig.6 will surely give a texture weave, but hardly a lace.



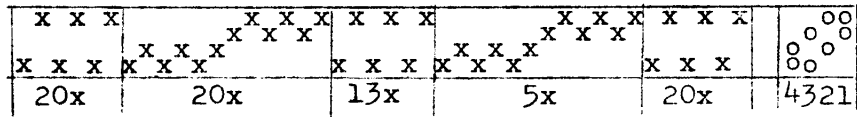
tr.: 2,4,1,3      Fig.6.

The fabric will have a faint crepe effect, and if used for yardage it has the interesting possibility of giving tabby selvages.

PRACTICAL PROJECT      Cotton place mats in 12 x 12 huck lace.

Warp: 20/2 mercerized cotton, cream or ivory; 40 ends per inch;  
 Reed No.20; 2 ends per dent; No.of ends: 558.

Threading draft:



Weft: the same as warp, or softer of the same count and colour.

Treadling: tabby - 2,3; lace - 2,4,2,4,2,4,1,3,1,3,1,3.

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# S H O R T C U T S

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## TEMPLETS OR STRETCHERS

We shall interrupt the logical sequence in which we have been describing the weaving equipment, and jump ahead to the stretchers. We are doing this because we must have a stretcher if we make experiments with Net Weaving, and good stretchers are hard to find on the market.

The origin of the name: Stretcher is obvious, because the gadget stretches the fabric. But the other name: Temple, or Templet is rather curious. "Templum" in Latin meant first a piece of land, open ground, then consecrated ground, and finally a building erected on such a ground. But it has also another meaning: a short beam used in building. Our "templet" comes obviously from the latter. The word "Temple" should be reserved for consecrated buildings, to avoid confusion. Yet in old books about weaving we find temple as often as templet, both meaning a stretcher.

The templet used in handweaving is made of two flat pieces of wood either hinged or sliding on each other. Both pieces together form a wooden lath of an adjustable length. Each end of a templet has a row of sharp needles. The more of these needles and the finer they are the better. The needles are pressed into the fabric very close to the edge, then the templet is stretched to the proper length and locked in this position.

The obvious purpose of a templet is to prevent the take-up in weft, or pulling-in of the edges (unjustly called "shrinkage"). But here immediately the question arises: why should there be such a take-up, which would require special measures? We know that if the warp is properly set, and the right kind of yarn is used, there should not be much pulling-in. This is absolutely right, and therefore the templets are or rather should be used only in exceptional cases.

A templet has the following drawbacks: it does not work in a continuous way (except in power weaving where a templet is of completely different construction), because we must set it in one place,

then weave for a few inches, and then re-set it again. Thus the fabric is stretched at an uneven rate, and the edges are wavy. This effect produced by the templet may disappear in washing and ironing, or it may not. The needles may leave holes at the edge. Finally, weaving with a templet is slower than without.

Therefore for all these reasons the templet should be avoided at all costs. Yet there are legitimate cases when we cannot do without it. They are as follows:

1-st. When for any reason whatsoever we use a very low sett of warp (light fabrics made of comparatively heavy yarn).

2-nd. When we must weave with an elastic weft on a stiff (non-elastic) warp. For instance cotton weft on linen warp.

3-rd. When because of the wide warp, and weak warp yarn, even the normal take-up is too much for the edges (woolen fabrics 40" or more with singles in warp).

4-th. When the nature of the weave itself involves an unusual amount of the take-up in weft (bound weaves). But even here, if the time element is not too important, we should rather leave the proper length of weft in each shed.

5-th. When the weft must be tightly stretched to produce the required texture of the fabric (cross weaves, net weaves). Here leaving plenty of weft in each shed would be worse than useless, because it would produce an entirely different weave (sort of Spanish Lace instead of Leno, for instance).

Most of these cases are exceptional, yet if the weaving is to be done at all, we must use templets.

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Of the two kinds of templets mentioned before (sliding and hinged) the hinged type is much superior, because it stretches the fabric always to the same width, and it requires little time to move it to the next place. The only advantage of the sliding type is that it can be very finely adjusted to any width, when the hinged one works by steps of not less than  $\frac{1}{2}$ ". Thus for instance if we want a width of  $12\frac{1}{4}$ " we must make it either 12" or  $12\frac{1}{2}$ ". A combination of both would be just perfect, but none is on the market, and the construction would not be very simple.

The hinged templet works on the following principle (fig.1). Two pieces of wood fit into each other so that they can be adjusted from the lowest length to nearly twice this amount, but never more than that. The adjusting consists on passing a bolt into one of a row of holes in one of the two pieces. This bolt is at the same time the

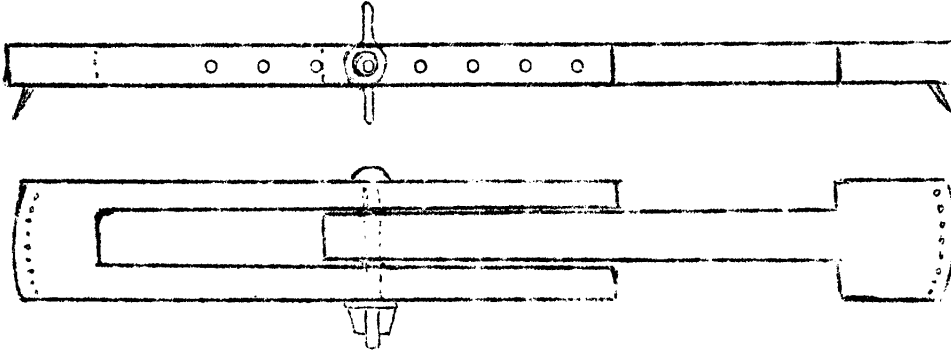


Fig.1

hinge which joins the two levers. It should have a winged nut for locking. The desired width of the fabric is chosen first, and the bolt inserted into the proper hole. Then the templet is partly folded until it fits the actual width of the fabric. The needles or points are then pushed into the edges and the templet straightened out to the full length. Now the fabric should become as wide as the warp in the reed, the bolt is locked, and the weaving can begin. After a few inches the operation must be repeated: the more often the better for the fabric.

If we do a lot of work which requires templets, we must have a set of them. For instance one templet may be used for fabrics from 12 to 18 inches wide; another from 18 to 27; a third from 27 to 40, and so on. For experiments with sample looms we may need a very small templet: from 8 to 12 inches.

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A "perfect" templet could be built, but was not so far. It is an interesting problem for somebody who owns a well equipped workshop and likes experimenting. First of all the needles should be replaced with rubber-lined jaws (as a small vise) which would grip the edges. The length should be adjustable in a continuous way (sliding type), but the hinge must be retained for fast shifting the templet from one position to the next. In all such a perfect templet would be too expensive to be of any practical value.

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