

MASTER  
WEAVER

BI-MONTHLY BULLETIN FOR HANDWEAVERS



AUGUST

1952

FULFORD · QUEBEC · CANADA

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- 3 - There is a fee of one dollar which must accompany each question. This is returned immediately if we cannot answer your question.
- 4 - If the question is of such a nature that it cannot be answered in 500 words, we may either give you information about books or other publications discussing your problem, or advise you what would be the cost of a complete answer.
- 5 - We shall try to answer your letters immediately. In exceptional cases when we shall have to consult sources not readily available, it may take up to two weeks.
- 6 - To avoid misunderstanding, your questions or problems should be presented with all details.

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# MASTER WEAVER

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Z - HANDICRAFTS • FULFORD • QUEBEC • CANADA

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August, 1952

No.5

## THE BEST LOOM.

Whenever two weavers come together there is always the same topic of conversation: looms. And unvariably beginners ask the same question: which is the best loom? And not only beginners.

Well, is there such a thing as "the best loom"? I doubt it. We are still in the stage of building looms based on old models used for centuries in industrial weaving and highly specialised. They all have been designed for one particular purpose, and every one of them is "the best" for this particular purpose. But what we want is a loom which could be used for everything, and which could be re-set from one weave to another with minimum of effort and in the shortest time. Then we would like it to be light, portable, and easy in operation. So far not a single model on the market even remotely resembles this ideal. And probably none will for quite a long while.

The difficulty is that many of our requirements are contradictory. A loom easy to set up will be heavy to operate. If it is light in weight it will not be steady, and if it is simple it will have rather limited use.

Perhaps in a not too remote future we shall have looms with small electronic brains, where a draft for threading will be prepared on a small perforated card, and the loom will do the rest. There is already on the market a small power loom with electromagnetic control for 24 heddle-frames and as many "treadles". The weave is plotted on a perforated board with 576 holes. The threading is done once for ever and the warp may be of "any" length. The 20" model is still rather expensive (about \$ 5.000 with accessories), but even if it was cheaper I doubt whether any real craftsman would enjoy working on it.

Among all hand looms the single tie-up jack-type is the most universal. It can be used with any number of frames, the tie-up is not only simple but does not require accurate adjustment, and ties of standard length can be used. If built for narrow warps it is not too heavy in operation. But it is a hopeless proposition when economy of time and effort comes into consideration. If it is "universal" the weight of heddle-frames must be such as to meet all emergencies, which means much too heavy for ordinary weaving. If they are only reasonably heavy the loom will be useless for very unbalanced tie-ups (such as spot weaves on 12 frames) and for very sticky or very closely set warps. If it is a large model it will be unreasonably heavy in operation for narrow warps, regardless of the weave used.

This is because these looms were designed originally for production, and only one type of weave and only one width of fabric were woven on each loom. If the weave was for instance spot-lace then the first frame was weighted much more than any other, the second was lighter, and the remaining "spotting leaves" were still lighter. But even under the best circumstances not much speed can be developed because the frames descend only by the gravity, and gravity means time. Poorly designed looms of this kind with too slender jacks, and elastic cords have still another drawback: they oscillate before settling in their lowest position which means that the weaver has to wait until they do so. The remedy: strong jacks and lamms, and only linen cords. When pulleys replace jacks, at least one source of trouble is removed, but another: friction, is introduced. Ball bearings can reduce friction but then they are expensive.

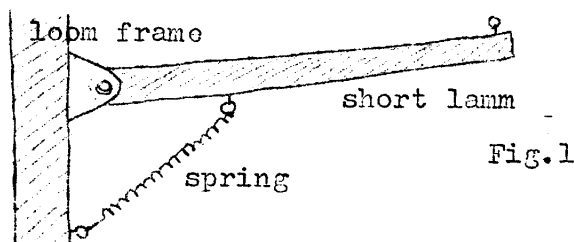
Another universal or nearly so loom is the double-tie-up jack-type (Swedish, countermarche etc). Here the heddle-frames are not weighted, so that the loom is much lighter in operation; they do not descend by gravity but are pulled down by the cords tied to the short lamms, so that higher speed of weaving can be achieved. Any shed will open regardless of the unbalanced tie-up, stickiness of the warp, or its close sett. A narrow warp can be woven on a wide loom without any difficulty. Besides these it has all the advantages of a single tie-up loom, except one: the tie-up. Not only that it has at least twice as many ties as any other loom, but half of these ties must be carefully adjusted, and really all of them should be carefully adjusted for a good performance. This means 48 ties or more for 6 block lace, and 160 ties for 12-frame twill.

Here one may argue that the time lost in tying-up will be soon recovered in weaving, which as stated above is faster than on a single tie-up loom. It is true, but it is a poor consolation for a weaver who has to lie on his back for two hours under the loom with different parts of his anatomy going to sleep every few minutes.

So much about "universal" looms. Since they are not quite satisfactory, the best solution for a weaver is either to limit his activities to one line of weaving, or to have several looms, each for a different purpose. Both solutions come really to the same: selection of a loom best adapted to a particular technique, weave, or fabric.

Single tie-up jack-type if used at all, should have adjustable weights attached to each heddle-frame. These should be selected with regard to the threading draft (the more heddles on a particular frame, the more weight), the width of the warp (the wider - the heavier the frames), and to the physical properties of the warp. These looms should be used only when the cost of equipment is of primary importance, because a double-tie-up loom although more expensive is much more satisfactory, and if necessary it can be used as a single-tie-up. This is done by tying only long lamms, and weighting either the frames or the short lamms. Here the weights can be replaced by cheaper arrangement of springs (screen door springs) attached to the short lamms not too far from the hinged ends.

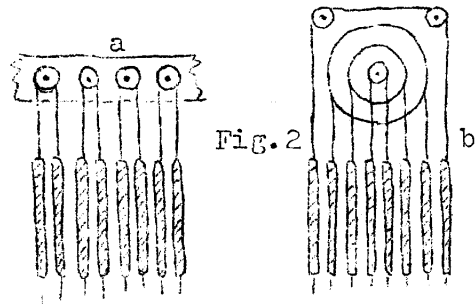
The pulling force can be regulated by stretching the springs more or less (fig.1). Whenever this is not satisfactory, the full double-tie-up will be used. Partial double tie-up may help also in cases when only some of



the sheds do not open properly.

Whenever there is question of four frame weaves, nothing can be as efficient, simple, light and fast in operation, as a counterbalanced loom. This is at its best with balanced tie-ups, but can be used with the unbalanced ones with a shed regulator (see the 1-st issue of MW) and even then it will be much superior to a jack-type, because the tie-up is simpler than in double-tie-up and the operation much lighter than in single-tie-up. With such weaves as lace, swivel, M's-and-O's, huck, honeycomb (waffle), and even cross weaves (leno) the speed of weaving is nearly the same as for tabby. With a very simple additional equipment two-block velvet (warp-pile weave), and multiblock chenille (twice woven rugs) can be made. With a little more elaborate attachment a counter-balanced loom can be converted into a draw-loom for such weaves as lace, spot, paper spot (dropped weave), embroidery (Dukagang) and swivel.

When more than four frames are required the counterbalanced loom is not as universal as with four. It can be used for instance for damasks and other turned twills (from 6 to 10 frames) on the condition that patterns are only two-block ones, and without ground, i.e. that the two blocks are not combined. Then the frames are hung in pairs (fig.2)



An efficient 6-frame arrangement has four frames hung in the usual way with a shed regulator, and additional two frames balanced separately. Such a harness will weave four-block lace (plus ground), swivel, huckaback, summer-and-winter (on opposites only), 2 block dimity (1:2 twill) and many other weaves, but not straight twills for instance. There are many variations of multiple-frame counterbalanced loom, but all of them are more or less specialised. What they have all in common is the speed of operation, and simplicity of the set-up.

Draw-looms give complete freedom of pattern, but unless a draw-boy (a helper) or a dobbie (or Jacquard machine) are available, they are much slower than straight multiharness looms. Then they are more bulky, much more expensive, and their "gating" or adjusting of the upper and lower tie-up takes much more time. Consequently they are hardly indicated for production which is supposed to be sold. They are economical only on very long warps when the length of cloth justifies a very involved tie-up (for the draw-boy) or punching the Jacquard cards. Otherwise they are excellent for the hobbyists. Needless to say that a draw-loom even at its worst is much faster than free weaving or pick-up method.

To the same class as the draw-loom belong two-harness looms. One harness of 4 or 5 frames weaves the ground, and another of any number of frames - the pattern. Compared with draw-loom they are much faster but they give much lower number of blocks in the pattern. The lower number of blocks - the faster the operation. With a draw-loom 160 blocks of pattern for 40 inches wide warp is about the lowest limit, when with two-harness method anything above 20 blocks is hardly practicable.

Then there is a class of looms which are automatic in a lower or higher degree. The simplest of these is the fly-shuttle loom, operated by hand and foot power. For a hobbyist a fly-shuttle is of little use, unless he has several looms, and needs one for wide fabrics. Weaving of such fabrics with fly-shuttle is superior both to double-width-cloth

and to "two-weavers" looms (looms on which two weavers work simultaneously).

Automatic take-up motion usually associated with fly-shuttle can be installed on any loom and then gives uniform beating regardless of the weaver's skill. If combined with flying shuttle, it is the nearest to the power loom. A fully automatic hand-loom has all this, plus an automatic beating equipment, so that the weaver operates only two treadles, and the loom does the rest. Obviously this last class does not interest a craftsman.

Frame looms, particularly large vertical models with a simple shedding motion, are a necessity for tapestry weaving. But small looms built on the same principle: box, cradle, board, etc. are good only for occupational therapy, or for nursery. Unfortunately table-looms are not much better. They may be used for sample making if they have a large number of heddle-frames and are strong enough to stand "heavy" beating. They should be as narrow as possible - 8 inches or so. Large table looms take as much space as foot-power looms, and cost only a little less. Their battens are always too light, and they are too slow to give any satisfaction to the weaver.

It is clear from the above that the weaver must specialise in one particular line, and then he can use one loom, or if he wants to be universal, he has to have several looms: one 4-frame counter-balanced with a shed regulator, one double-tie-up jack-type with as many frames as his pocketbook can stand, one draw-loom, and one tapestry loom. A narrow table loom for making samples will be optional. The jack-type should be built with several warp beams, two battens, and enough space on the batten for such attachments as bead-lamms for net weaves, or lappet frames for embroidery. All looms should have detachable shuttle-races, and they should be equipped with friction brakes on warp beams, and ratchets on cloth beams.

Warping equipment should consist of one frame for short warps, and a warping mill, or at least a horizontal warping reel for longer ones.

The above would be an ideal solution, but we have to make compromises, and it is up to us to select such an equipment, as to satisfy our requirements. As long as we do not expect one loom to have all merits, we won't be disappointed in our choice.

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## ERRATA:

In the 4-th issue of Master Weaver, page 11, line 17-th from the top, instead of "3, 4, 6, 7, 4, 5" should be: 3, 4, 6, 7, 6, 4, 4, 5.

On the same page, line 19-th: instead "only 7 figures", should be: "only 8 figures".

Please, correct the above mistakes and accept our apologies.

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# SWIVEL EFFECT IN OVERSHOT.

Swivel weave (compare "Spot Weaves" in the 1-st issue of MW) has one peculiarity, which no other weave possesses - both pattern and ground are woven in tabby. This makes it particularly suitable in all cases where floats of weft or warp are objectionable, for instance in upholstery fabrics. It is true that during weaving there are floats, even very long ones, but they do not produce pattern, appear only at the back of the fabric, and can be either cut off, or left if the fabric is going to be used as upholstery, cushion covers, or in any article with lining, such as heavy curtains, shopping and evening bags etc.

The lining can be made later on, or it can be woven at the same time as the pattern fabric, and further it can be either free and attached at the selvages only, as in circular weaving, or stitched to the fabric at regular intervals. This is however of secondary importance.

The swivel weave proper is woven on Spot-weave drafts, but with a different tie-up. It is best adapted for small patterns widely spaced on a tabby background. It may be used as well for all-over patterns of three blocks (for 4 frames) which can be woven singly or in any combination. These blocks do not overlap each other.

On the other hand the same effect can be obtained by using any overshot threading, with the following restrictions: the blocks will overlap by about one half of their length (exactly as in 4-block crackle), and they cannot be combined i.e. woven simultaneously. To compensate for these limitations, we have four and not three blocks on a four-frame harness. The patterns used here should be the same which give good results with crackle weave.

To compare the patterns in overshot and in swivel we shall examine two draw-downs: one in classical overshot, and another woven on the same threading draft in swivel. In both cases we shall omit the tabby in the ground (binder in case of overshot).

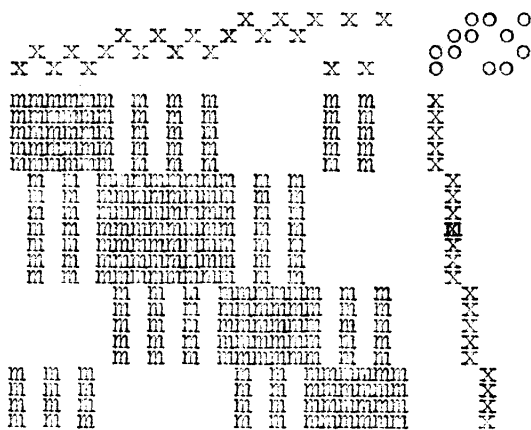


Fig. 1 Overshot

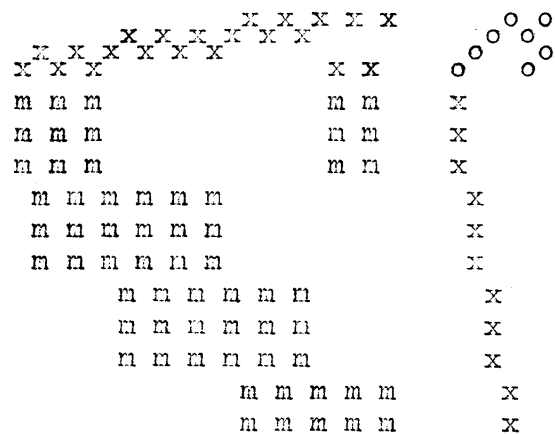


Fig. 2 Swivel

The shots of pattern in case of swivel are spaced more than in case of overshot, because there are TWO tabby shots in between instead of one. The long floats in weft are here on the back of the fabric. The binder can be omitted when changing from one block of the pattern to the next, since these are written on opposite tabby sheds anyhow, or

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two shots of tabby can be continued throughout.

Another way of treadling, which will bring the pattern shots closer is to put the binder in the same tabby shed with the pattern. For instance: pattern weft on treadle 6 (fig.2), binder on tr.4, then binder on tr.1. In this case the whole treadling would be: 6,4,1,6,4,1 6,4,1,3,5,2,3,5,2,3,5,2,1,4,6,1,4,6,1,4,6,1,2,3,5,2,3,5. Pattern weft on underlined treadles, binder on other treadles. This is of course only a fragment of a pattern but the same principle will apply to the whole pattern.

Exactly as in the case of crackle woven as summer-and-winter, where pattern blocks have the texture of S+W, and the half-tones - the texture of crackle, the swivel can be woven with pattern blocks in solid tabby, and half-tones in tabby alternated with binder, in which case the same draft will be treadled as follows (fig.3).

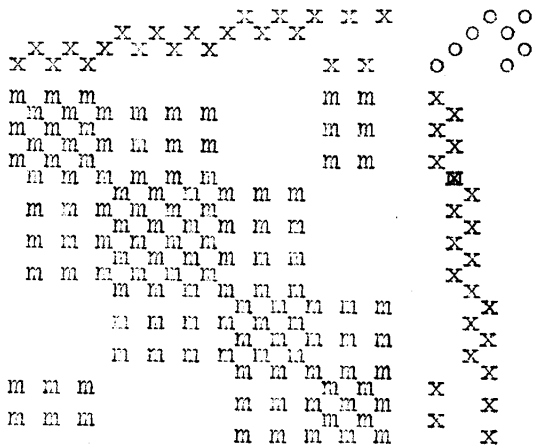


Fig.3 Staggered swivel

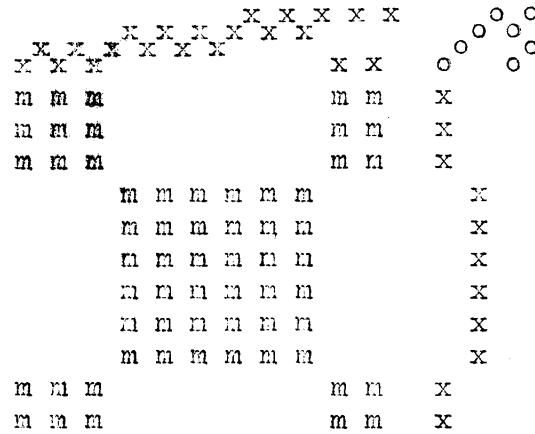


Fig.4 swivel on opposites.

Here any overshot pattern may be reproduced without distortion, on the condition that the floats on the back of the fabric will not be cut. Otherwise the cutting might take more time than weaving.

Finally the same draft may be woven on opposites (fig.4) even if it is not written on opposites, but then the pattern will be quite different from the original one.

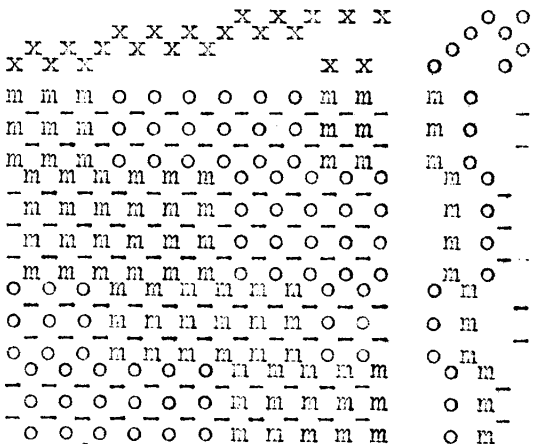


Fig.5

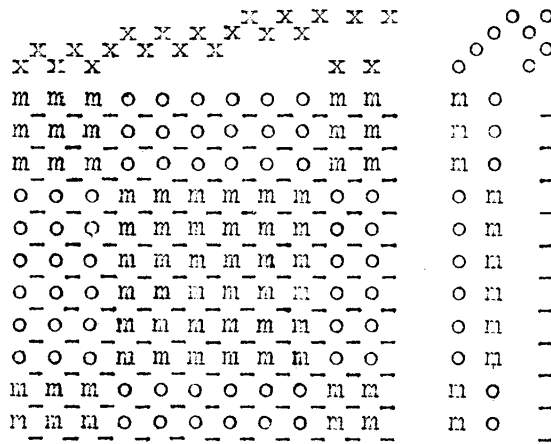


Fig.6

Colours can be introduced in the pattern in two different ways. When weaving on opposites as in fig.4, one block of pattern can be woven in one colour, and the other block in another colour, the binder



being always neutral. Or two colours can be used in two complementary sheds, followed by a shot of neutral binder. The second method will work with overlapping blocks as well as on opposites (figs. 5 and 6).

In all methods of weaving described above, the sett of warp and the grist of the binder and of the pattern weft should be selected so that the blocks of pattern could be squared without "cheating" i.e. without subtracting or adding shots of pattern to get the depth of blocks equal to their width.

When weaving in one colour only, two grists of binder may be used for better results. The binder which comes into the same shed as the pattern weft should be of the same grist as the latter, when the binder dividing the shots of pattern should be much lighter. This calls for three shuttles. For instance in fig.2 the binder used on treadles 1 and 2 must be finer than the one on treadles 3, 4, 5, and 6.

The sett of warp depends on the grist of the fine binder, the pattern weft, and the beating. It should be rather close to the sett for plain tabby, perhaps a shade more open.

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## WEAVING TERMINOLOGY.

### The "TWO-HARNESS METHOD".

The ambiguity of the word "harness" (see 1-st issue of MW) becomes most annoying when the term is applied to the "two-harness method". Until quite recent times it could mean only one thing: weaving with two sets of heddle-frames, one with plain heddles, and one with long-eye heddles. The two sets (two harnesses) are about one foot apart, and the front one has long-eye heddles, when the back one has ordinary heddles but rather longer than usual. One set weaves the pattern (usually but not always the back harness), and the other weaves the ground. This method is rather involved but very economical, because the total number of frames is much smaller than in case of a single-harness loom (for the same weave and pattern), the tie-up much simpler, as well as the threading. But it requires a high degree of skill in setting up and gating (adjusting) the loom.

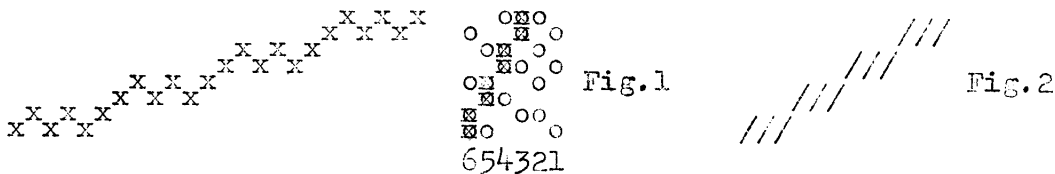
On the other hand what is described now, particularly in the United States, as "two-harness method" is nothing else but weaving on two frames, which is at the best a method suitable for tabby only, and even then not very good. If anything else but tabby is attempted the "method" becomes the pick-up - inefficient, time-consuming, and needless torture. Except of course in tapestry weaving, but then why call it by a new and misleading name, when this kind of weaving is probably thousands of years old. It should be called "weaving on two frames", exactly as walking should be called "walking" and not "two-foot-transportation method".

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# INFORMATION SERVICE

## Overshot drafts on 8 frames.

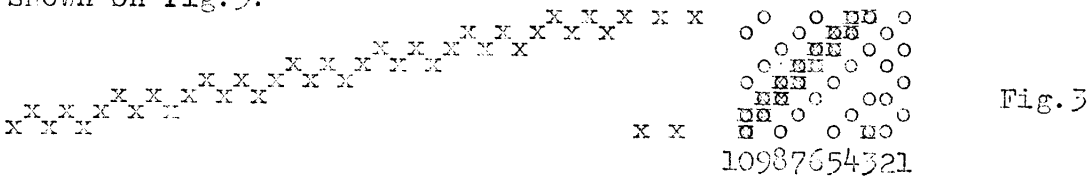
As everybody knows, the overwhelming majority of overshot drafts are written on four frames. An exception are drafts written on opposites. Here each block of pattern requires two frames, and consequently 4 blocks must be woven on 8 frames. Since however the floats at the back become very long, they must be stitched to the fabric. Thus a typical 8 frame draft will have in the tie-up two kinds of ties: one for the pattern floats, and one for the stitching. For instance a draft for a diagonal of 4 blocks will be as follows:



Treadles 1 and 2 (fig.1) are tabby, 3 to 6 - pattern. Ties marked "x" are pattern ties, and "o" - stitching ties. Thus the longest float on either side of the fabric will have 6 ends.

Colonial drafts of this kind are very rare, and often written in the same way as twills, particularly turned twills. The above draft in such a notation will look as on fig.2. At the first glance it looks as a four block turned twill. The tie-up will show whether it is twill, or overshot.

Now the question arises whether 8-block overshot could be woven in a similar way. The answer is yes, but it is doubtful whether this was often done in colonial times. An example of such a draft is shown on fig.3.



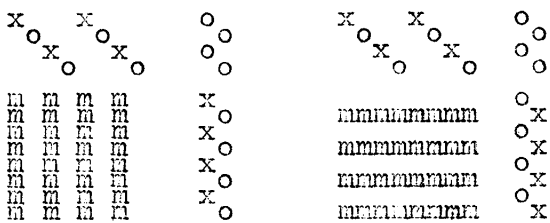
This is just a diagonal or a small part of a pattern. The treadling: 10 - 5x, 9 - 5x, 8 - 5x, 7 - 5x, 6 - 5x, 5 - 5x, 4 - 5x, 3 - 5x, plus the tabby binder of course.

It is rather obvious why the straight overshot was seldom if ever woven on 8 frames. Even the four-frame overshot gives quite elaborate patterns. With 8 frames they would be much more so, but at the same time they would not give the weaver much freedom of design, because here as well as in 4-frame overshot, the blocks can not be combined, i.e. not more than one block of the pattern can be woven at a time. From this point of view even a 6-frame summer-and-winter is superior to 8-frame overshot. With 8 frames available more interesting weaves could be attempted and so they were. Thus 8 frames were used occasionally to transcribe 4-block straight overshot into one woven on opposites, but not to create still more involved patterns.

# COLOURS IN SIMPLE WEAVES

Introduction of colours both in weft and warp produces often quite unexpected results. It can give new possibilities to weaving techniques, because in many cases it increases the number of pattern blocks which can be woven with a given number of heddle-frames.

For instance plain tabby does not give any pattern, unless stripes both in warp and weft combine to form a plaid, or tartan. But by alternating two colours both in warp and weft we can get fine stripes which will run either horizontally or vertically (fig.1)

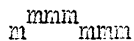


Thus we can weave two-block patterns where one block will have horizontal and the other vertical stripes.

Any summer-and-winter pattern for 4 frames may be transcribed into tabby in this way. All we have to do is to replace one unit of S+W

Fig.1  
x - one colour, o - another colour; if x = black, and o = white, then in the draw-down "m" is black.

with  $\begin{matrix} x \\ \circ x \end{matrix}$ , and the other with:  $\begin{matrix} \circ x \\ \circ \end{matrix}$ . For instance fig.2 is a transcription of a profile:



Whenever two units meet, they should be spaced with the same colour. In fig.2 at "a" it was white (o), consequently we had to correct one unit at "b" from xoxo into ooxo. Otherwise the two blocks of pattern would meet with two black heddles, and the pattern would be unbalanced.

To get good results, one should weave a 50-50 tabby, weft and warp of the same yarn and grist. But the contrast between the two colours does not need to be very great. Natural and bleached linen, or beige and white cotton will give quite a satisfactory effect.

When making draw-downs in colours we start by marking out (with pencil) the position of weft. Then we fill the colours in weft as indicated by the treadling draft, leaving the whites empty except for the pencil marks which indicate that the space belongs to the weft. Then we fill with colours all unfilled, and unmarked spaces, working now in the vertical direction along the warp ends. Their colours are marked in the threading draft.

If the draft does not contain any white, then the draw-down is even simpler. We start with weft filling it with proper colours without marking it out first. Then we fill the warp spaces. It is

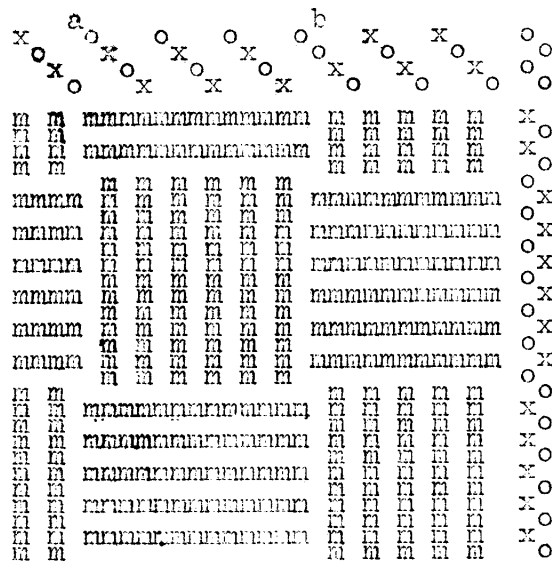


Fig.2.

advisable to keep in mind that such a draw-down does not show the texture of the fabric but only the colour effect. Should the texture be required as well, another draw-down in white and black must be made.

The same principle which worked with tabby will work with basket weaves as well. Let us take as an example a 3:3 basket (fig.3).

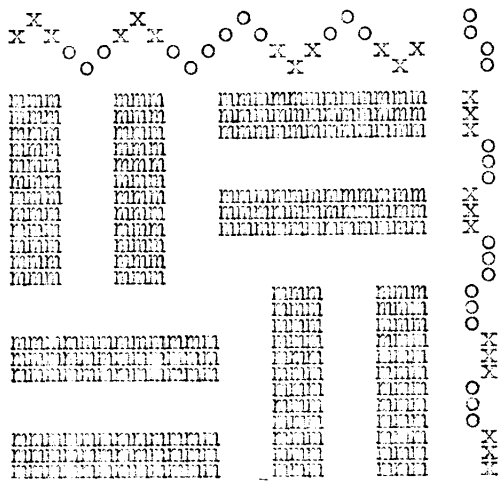


Fig. 3

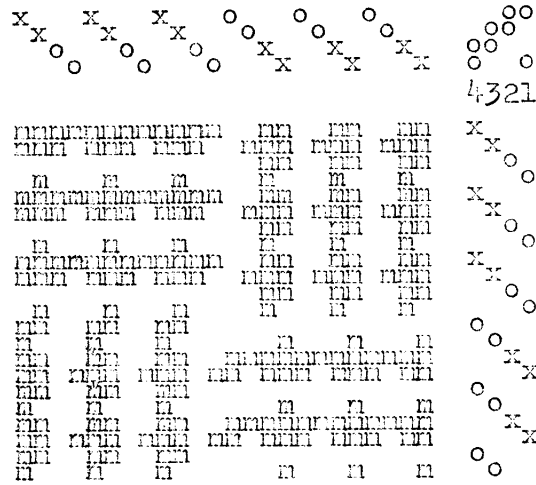


Fig. 4

As it was to be expected the lines in case of basket are much heavier. Twill (fig.4) gives similar effect but the lines are blurred. And again any two-block pattern can be transcribed into twill, by replacing one block with "xxxo" and the other with "ooxx".

If instead of plain twill, a broken one is required, the same threading draft may be used but the treadling will be: 4x, 2o, 3x, 1o, 4x, 2o, 3x, 1o, 4o, 2x, 3o, 1x, 4o, 2x, 3o, 1x. Number indicates the treadle (tie-up in fig.4) and the following letter - the colour.

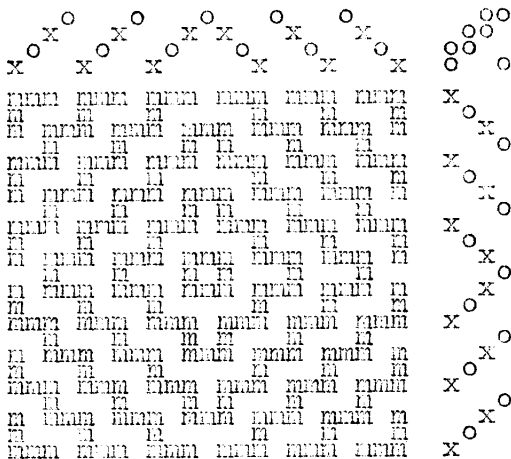


Fig. 5

Alternating colours instead of using them in pairs as in fig.4 produces a diagonal which runs in the opposite direction to the diagonal in the texture. Thus patterns can be woven in diamond twills, where the colour forms a diamond and the texture - a cross, one pattern underlying the other.

Combining both threading methods: ooxx or xxoo and xoxo or oxox, we can have part of the twill fabric woven in diamond patterns and the other in horizontal and vertical stripes. Such combinations however are rather risky, and should be first worked out on graphpaper.

The colour effects can be used not only in pattern weaving but in simple textures as well. They may give an impression of rough texture where none is present. Or they may suggest a texture weave, which would require many more heddle-frames if woven in one colour.

Fig.6 shows a small pattern in tabby suggesting wicker-work. There are twice as many ends and picks of white than of black. Fig.7 also in tabby looks like 1:3 and 3:1 twills combined. Finally the

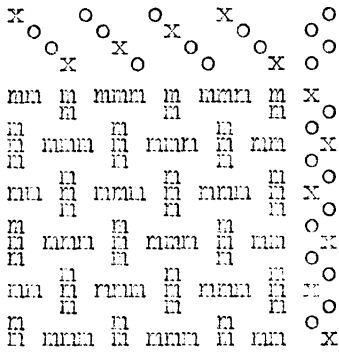


Fig. 6

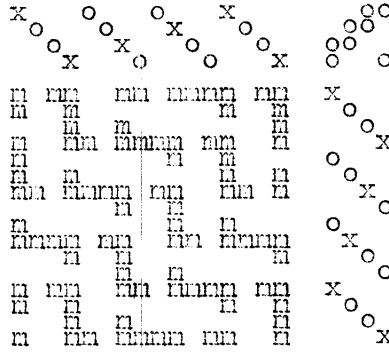


Fig. 8

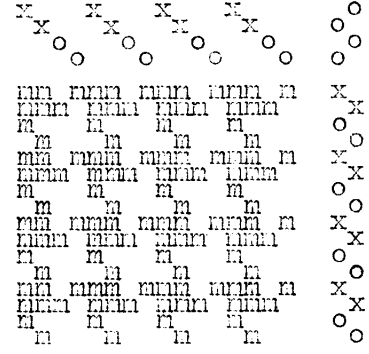


Fig. 7

twill on fig. 8 looks like an 8 frame twill. In all cases the weave suggested by the colour pattern is more complicated than the real one.

Three colours give still more possibilities. Let us mark black as "x"; grey as "v", and white as "o", both in threading and treading drafts. In the draw-down: black "m", grey "v", and white not marked.

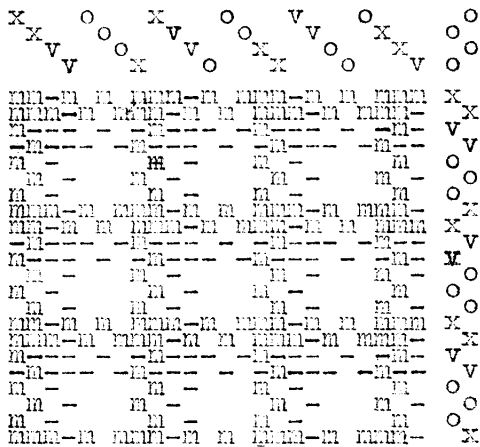


Fig. 9

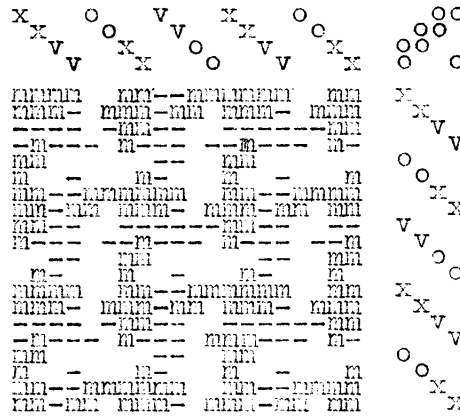


Fig. 10

The effect with tabby (fig. 9) corresponds to 8-frame weave, and with twill (fig. 10) to 12 frames.

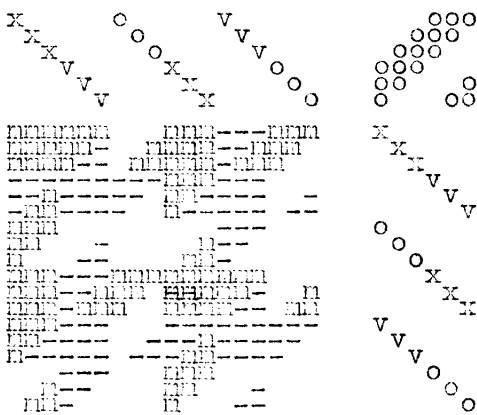


Fig. 11

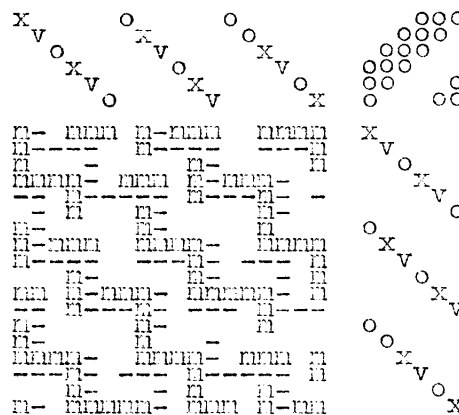


Fig. 12

On fig.11 we have a 3:3 twill with comparatively wide bands of colour both in weft and warp. In this case we could expect a checker effect, and this is roughly what we get, but the shape of checks is rather unusual, since they look like arrow-heads. In fig.12 the same twill but with finely distributed colours gives us broken zig-zag lines.

Comparing the draw-downs from 4 to 12 we can come to the conclusion that the number of colours and the way they are arranged are more important than the weave itself. That the wider<sup>er</sup> colour bands - the more like plaid the fabric looks, and that the most interesting are these combinations where the colours are used singly as in figs: 2, 5, 6, 8 and 12.

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FROM THE CLASSICS:

## STRIKING UP THE WEFT.

by Clinton G. Gilroy (1844)

That the cloth may be uniform in thickness it is necessary, that the lay (battch) should be brought forward with the same force every time. In the common operation of weaving, this regularity must be acquired by practice.

It is however, of consequence to the weaver, to mount his loom in such a manner, that the range of his lay may be in proportion to the thickness of his cloth. As the lay swings backward and forward, upon centres placed above, its motion is similar to that of a pendulum; and the greater the arc or range through which it passes, the greater will be its effect in pressing up the weft. For this reason, in weaving coarse and heavy goods, the headles (heddle-frames) should be hung at a greater distance from the point where the weft is struck up, than would be proper in light work. The point or rather line, where the last thread has been struck up, is called by weavers the fell.

The pivots upon which the lay vibrates ought, in general, to be exactly at equal distances from the fell, and the headles. But as the fell is constantly varying in its situation, (in hand loom weaving) during the operation, it will be proper to take the medium. This is the place where the fell will be when a bore (one pull of the warp) is half wrought up.

From this the following conclusion may be also drawn:

The bores ought always to be short in weaving light goods; for the less the extremes vary from the medium, the more regular will be the arc, or swing of the lay.-

The result of what has been stated above is, that in each of the three operations of weaving (i.e. treading, passing the shuttle, beating), the motions should be constant and uniform, and, that they should follow each other in regular succession. But some observations will be necessary to adapt these to different species of cloth.

The beauty or excellence of some cloths consists in the closeness of their texture, that of others in the openness and regularity of the intervals between the threads. When the latter is required, the weaver must vary his process from that which would be proper in the former.

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