

The background of the cover is a collage of various weaving charts and patterns. These include grid-based diagrams with different symbols and colors, some with handwritten notes in Finnish. One note at the top left reads '33 5K-8 5P-8 5T-8'. Another at the top center says 'loimi- ja kudel- mallaitte pomeia julkistety.' A chart in the middle right has 'Thread from' labels and 'A B C' markers. A chart in the middle left has '-26-' and '72D' markings. At the bottom left, there is a '3-752 K' label. The overall aesthetic is that of a technical manual or a collection of craft patterns.

MASTER WEAVER

**BI-MONTHLY BULLETIN
FOR HANDWEAVERS**



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

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Z-HANDICRAFTS - FULFORD - P.Q. - CANADA

March - April, 1963

Vol.23 No.68

P A T T E R N S I N T W I S T

When we speak about the twist of yarn we usually associate it with texture rather than with pattern. Thus we know that identical twist of warp and weft particularly in single wool tabby fabrics will produce crepe; that this effect may be enhanced by using opposite twist in alternating groups in each direction; that a smooth fabric must have the warp and weft of opposite twists, etc. But this has nothing to do with pattern.

Patterns in twist are made by combinations of two or more colours twisted together either in warp, or in weft, or in both.

The twist itself can have different pitch, and different direction. Thus we may have "zero-twist", or nearly parallel yarns; slow twist; and fast twist. Then we have left-hand (LH or S) twist, and right-hand (RH, or Z) twist. In all 5 variations. Yes, only five because zero twist cannot be RH or LH.

The equipment necessary for this type of weaving must include a spinning wheel; any kind will do. On the other hand no actual knowledge of spinning is necessary. We must have also a Doubling stand (see MW 31/11), which can be easily made at home. If we have no spinning wheel, we can either borrow one, or have the yarn prepared by a spinner. Buying a wheel specially for this project is hardly justifiable at this stage.

The fast twist is made on the wheel, the slow twist on the doubling stand, and the zero twist on any bobbin winder.

As usual when learning a new technique we start with a sampler. The warp should be of a neutral colour and rather open as for weft-face fabrics, for instance cotton 10/2 or 8/2 set 12 ends per inch.

For weft we should use heavy yarn, for instance cotton candle wick to start with, in two contrasting colours; e.g. white and black (warp grey), or cream and brown (warp beige).

Preparing of the fast twist takes time, particularly when it is done by a weaver without experience in spinning. The finer are the two yarns, the longer takes this operation, and the less spectacular are the results.

We wind two bobbins, one of each colour, and place them on a bobbin rack close to the spinning wheel. After passing both yarns through the end of the spindle and around a hook of the flyer we attach them to the bobbin. Now we start the wheel and keep both yarns in the fingers of the left hand. This will twist the yarns together. Now we must let the yarns slide through the fingers, so that the twisted yarn will be wound on the bobbin. The rate of twist depends on how tight we hold the yarn, and the direction of the twist - on the direction of rotation.

We should try to get a twist of at least 4 turns per inch. We prepare one bobbin (that is the bobbin on the wheel) with one direction, and another with the opposite direction. Every time we finish one bobbin the yarn must be removed from the wheel either on a skein winder, or on a plain warp bobbin, or finally on a number of shuttle bobbins.

The slow-twist yarn could be prepared also on the spinning wheel. The only reason we use a doubling stand is that the latter works much faster. The slow twist has one turn per several inches of yarn: from 3 to 10". Here we also prepare one bobbin of LH and one of RH twist.

Finally we must make one bobbin of zero twist. Strangely enough this operation is far from being an easy one, because if we simply wind a shuttle bobbin from two tubes, cones or skeins, the two yarns will not advance at the same rate, and in weaving we shall have loops at the edges.

The right way to prepare parallel yarns is to use either a warping frame or a warping reel (or mill). We wind the two yarns first on the frame, reel, or mill, but we do not bother to make any crosses. After the required amount is on the frame, we rewind it on bobbins.

Now we have 5 twists. We shall later on designate them by letters:

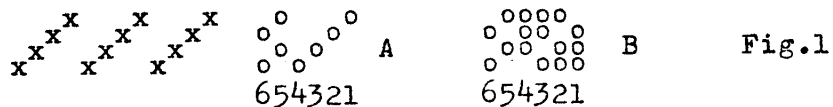
Z - zero twist, or parallel,
 SR - slow, right-hand twist,
 SL - slow, left-hand twist,
 FR - fast, right-hand twist,
 FL - fast, left-hand twist.

One may ask at this stage, why 5? Why not 7, or 9, or any odd number? - For a sampler 5 will be enough. Then the slow twist is beyond our control, because it depends only on the diameter of the tube used. The fast twist made on a spinning wheel may have at least in theory any number of turns per inch, provided that we have mastered the operation of the wheel. Thus in later projects we may find it advisable to use several pitches of the fast twist, Right now it would be an unnecessary complication.

Here is a technical remark: the harder the twist, the more difficult is the yarn in handling. It has a tendency to form small, tight loops when used as weft. When very hard twist is required it would help to prepare the required amount beforehand, stretch it very tight on a warping reel, and leave it for several days, or even longer. This should take out the kinks.

Now we have our 5 twists in 5 shuttles. It will help to mark the shuttles with appropriate letters: Z, SR, SL, FR, and FL. When the yarn is wound on shuttle bobbins it is very hard to tell at a glance which twist is which.

We have already made and threaded the warp (fig.1).



Tie-up "A" is for jack-type looms, and "B" for counterbalanced, or inverted jack-type looms. With these tie-ups samples can be made in tabby (5,6), biased 3:1 twill (1,2,3,4), and in broken twill (1,4,2,3). Make all samples about 3" wide. Here is the list:

1. Z - a) tabby; b) biased twill; c) broken twill;
2. SR - a) tabby; b) biased twill; c) broken twill;
3. FR - a) tabby; b) biased twill; c) broken twill.

This is an introduction. One should decide now which of the three weaves is the best, and use this particular weave for the next samples. The numbers mean the number of shots, not the treadle.

4. 1-SR, 1-SL. Repeat to make 3".
5. 1-FR, 1-FL. Repeat.
6. 1-Z, 1-SR, 1-FR, 1-FL, 1-SL. Repeat.
7. 1-Z, 1-SR, 1-FR, 1-FL, 1-SL, 1-Z, 1-SL, 1-FL, 1-FR, 1-SR. Repeat.
8. 4-Z, 2-SR, 1-FR, 1-FL, 2-SL, 4-Z, 2-SL, 1-FL, 1-FR, 2-SR. Repeat.
9. 6-Z, 1-FL, 1-FR, 6-Z, 1-FR, 1-FL. Repeat.

These samples should give a general idea of how the twist can be used in building up patterns. The next step is to introduce single colours: loosely twisted two yarns of the same colour. Then we can weave the traditional "tree" effect. For instance: white, white-&-green (FR), green, white-&-green (FL); repeat.

There is no reason why we should stick to two colours only. But with a larger number of colours it is advisable to plan the pattern first and make only the twists necessary for this particular pattern; otherwise we would run into an awkward number of shuttles; it would take 18 shuttles for all possible combinations of 3 colours.

What we have done in weft can be less easily done in warp. The only problem is to prepare a sufficient quantity of yarn, particularly in hard twist. The warping will take time, but the number of ends will be small, because the heavy yarn will have to be set very open, not more than 8 ends per inch. With a closer sett we would have a warp-face fabric, and the general effect would be the same as in our sampler, only turned by 90°.

The real purpose of twist effects in warp is to combine them with the twist in weft. There is here a possibility of using finer yarns than in our sampler and producing very interesting yardage for coats. Yes, but how about the amount of the hard twist required? The answer is a special twisting mill. We shall describe it some day.

F A B R I C S 6

T W I L L S 2

Twills do not need to have a continuous diagonal running at 45° all across the fabric. The pitch can change; the direction of the diagonal can change too, at regular or not so regular intervals (compare "Crazy Twills" in the same issue). Finally the diagonal can disappear entirely.

We shall start with twills which can still be called "biased", but which have "slow" or "fast" diagonals, that is of less or more than 45°. A diagonal which is less than 45° is supposed to be "slow", and one with more than 45° - "fast". It is hard to justify these expressions unless one thinks in terms of driving a car downhill; then the terminology becomes obvious. Fig.1 shows a slow diagonal and fig.2 - a fast one.

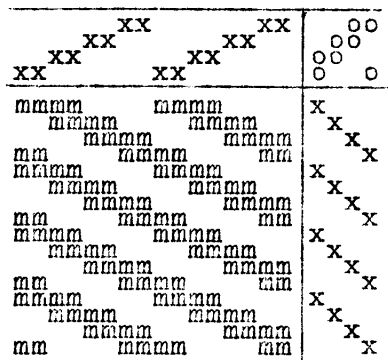


Fig.1

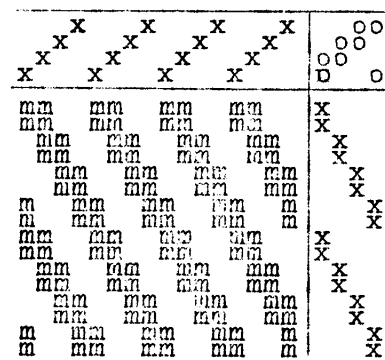


Fig.2

One does not need to go to the trouble of changing the threading or the treadling as in the above examples. A similar effect will be produced by using a warp yarn 4 times heavier than the weft in the first case, and 4 times lighter than the weft in the second case. The fabrics won't be the same, but the directions of the diagonals will. There is nothing particularly exciting in either of them. But if we combine both in the same draft, we have a wavy diagonal (if it can be still called a diagonal) as in fig.3. But in this case we must use about the same count of yarn both ways. Whenever we have two

parallel shots of weft, we weave them in the same way as basket weave (two shuttles, beat after changing the shed on the second shot).

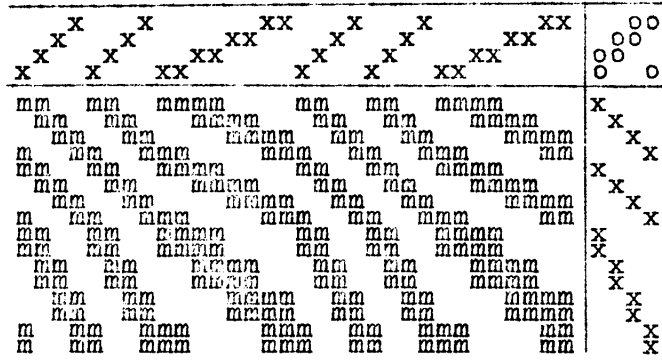


Fig.3

Fig.3 is only one example of this type of a twill. Many more can be woven on 4 shafts, and still more on a multi-shaft loom.

Since we are on this subject we might as well add that the same applies to all twills described here. The principle shown on four shafts, and in most cases on the 2:2 twill only is valid for other and higher twills.

With plain threading of a 4-shaft twill we have the following basic types of treading:

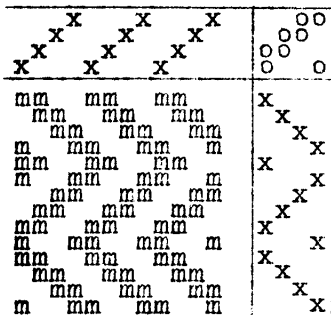


Fig.4

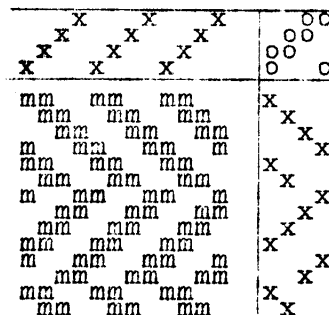


Fig.5

WAVE (fig.4). The diagonal changes direction, produces horizontal stripes, and also longer floats in warp (of 3) at every point of turning. These longer floats make the fabric less smooth, and also less resistant to friction. They can be eliminated in DORNICK twill (fig.5); this twill is sometimes called Dornick-in-Weft.

The direction of the diagonal in both Wave and Dornick can be changed as often as desired. But when we come to very short diagonals the situation changes. When the diagonal has only three "steps", the Wave becomes a STOCKINET (fig.6). In this case all floats in warp

Finally we have in the same group of twills two very interesting variations. One is a mixture of twill and tabby (but here tabby is not used as a binder) which makes the fabric stronger than twill but softer than tabby. Fig.10 shows the biased twill, and fig.11 the broken one. The latter is particularly good for yardage.

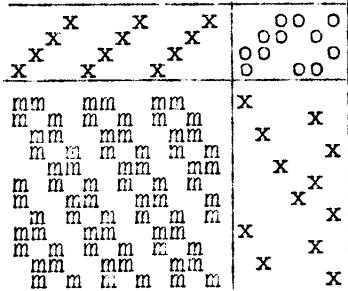


Fig.10

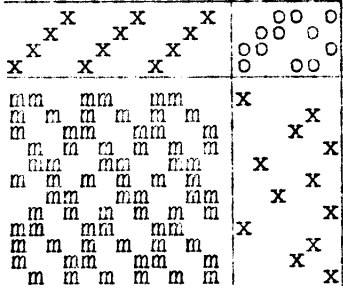


Fig.11

Both the above twills are not reversible: one side has all floats in warp of 2, when the other side has floats of 3.

The other variation are "fancy twills". Still based on the same standard threading and tie-up they have fancy treadlings, that is more or less free, or independent from the threading draft. Examples are shown in figs.12 and 13.

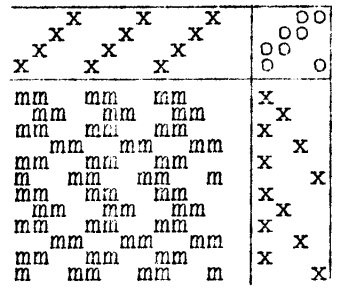


Fig.12

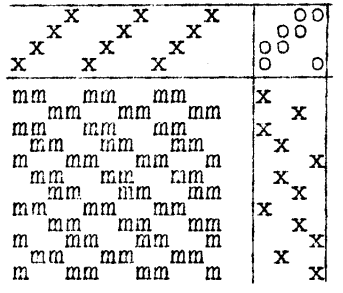


Fig.13

There is no formula for designing fancy twills, and this is why they are called "fancy", but there must be some limitations. The most important one is the length of floats in warp: they must be of reasonable length at least on one side of the fabric.

Since all the twills in figs.4 to 13 are woven on the same threading, it is really worth while to make a sampler. We may include as well twills described previously on page 7 (MW 67) figs.A, B, C.

In the next instalment we shall speak about twills woven on different threading drafts.

CRAZY TWILLS

"Crazing" is an expression taken from pottery. It means more or less accidental lines (cracks) in the glaze, when "crackling" is not accidental, but planned. Rather an astonishing parallel to the weaving terms, where "crackle" is also a planned effect.

To craze (from ME "crasen") meant originally to break into pieces; nowadays it suggests a disorder even of a mental origin.

Thus by "crazy" twills we mean twills where the bias (the diagonal) is broken in unexpected places, and creates an effect of irregularity of both texture and pattern, but still preserving the essential characteristics of a twill.

Probably Dornick Twill is a prototype of this class of weaves; the Crepe - its incidental sideline; and the Accidental Drafts - its ultimate in anarchy. But neither Crepe, or Accidentals can be called twills.

What all Crazy Twills have in common is their rather complicated appearance suggesting a high number of shafts, much higher than the number actually used. For that matter we do not see any necessity to go beyond four shafts.

Another peculiarity of this class is that if a Crazy twill is based on a tie-up for 2:2 twill, then all floats in warp and weft will be of two, which makes the fabrics very strong and eminently suitable for yardage.

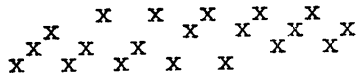
Finally Crazy twills besides normal diagonals, very irregular as a rule, show faint wide diagonals which can be used for pattern weaving.

The general principle of Crazy twills is that the diagonal in each repeat of threading and treadling is broken into a number of short diagonals divided by gaps, where the threading jumps from 1 to 3, 2 to 4, 3 to 1, and 4 to 2.

The short diagonals may go all in the same direction, or change the direction after every gap, or only every other gap etc. To design a twill of this class we must first of all establish a sequence of these short diagonals. We shall call the mounting diagonals (1234 from the left) by a "+", and the descending ones by "-". Thus a sequence: +3+2 (fig.1) means that we thread 123, jump back to

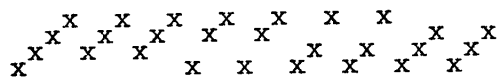
one, then go in the same direction, that is 12, jump to 4; keep on: 412, jump to 4, etc. It is obvious that the sequence is not the same as the repeat. As a rule a repeat should be longer, even much longer than a sequence.

A. Sequence +3+2; repeat 20.

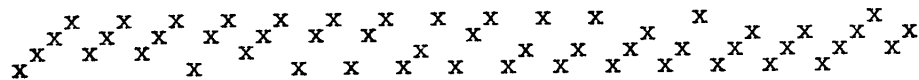


B. Sequence +4+3; repeat 28.

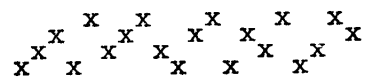
Fig.1



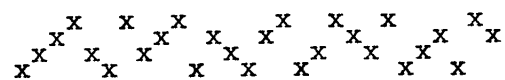
C. Sequence +4+3+4+2; repeat 52.



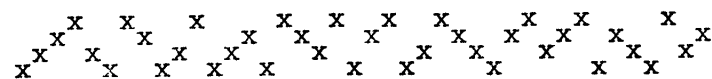
D. Sequence +3-2; repeat 20.



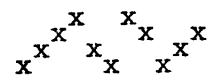
E. Sequence +4-3; repeat 28.



F. Sequence +4-4+2; repeat 40.



G. Sequence +4-4+3



From the first six drafts one could get an idea that the repeat is always 4 times longer than the sequence. Draft "G" proves that this is not always the case, but it is true that short repeats do not produce interesting drafts.

The treading always follows the threading that is it has the same sequence and the same repeat. Plain twill treading would produce fabrics very similar to Dornick, and fancy treadlings would not answer at all, because as likely as not they would produce long floats in warp.

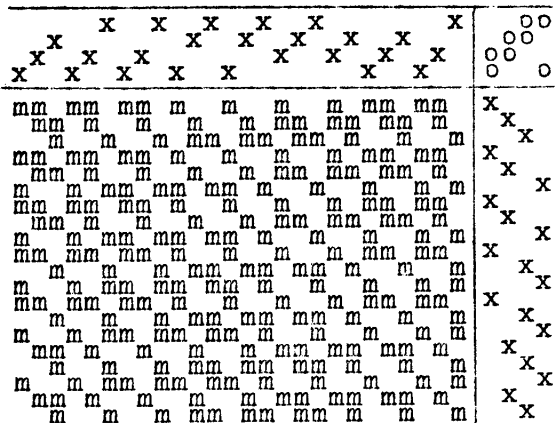


Fig. 2

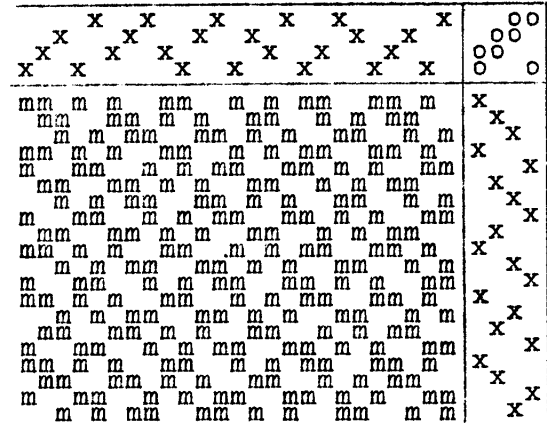


Fig. 3

The sequence in fig. 2 is the same as in Fig. 1-A, that is +3+2, and the sequence in fig. 3 the same as in 1-D, that is +3-2.

The draw-downs show that generally speaking the first twill is a biased one, even if it has 7 diagonals in each repeat, and none of them is quite straight. By reversing both: the threading and the treading it will produce large, faint diamonds. Why should there be 7 diagonals, when neither the sequence or the repeat have number 7 in them it is hard to explain. But then it is a crazy twill.

The twill in fig. 3 is rather puzzling. At first it looks like a broken twill, but it has a definite pattern of arrows pointing NE and SW. It has also a sort of a wide diagonal running at right angle to the arrow heads. Fig. 4 with a sequence +4-3 has a similar pattern.

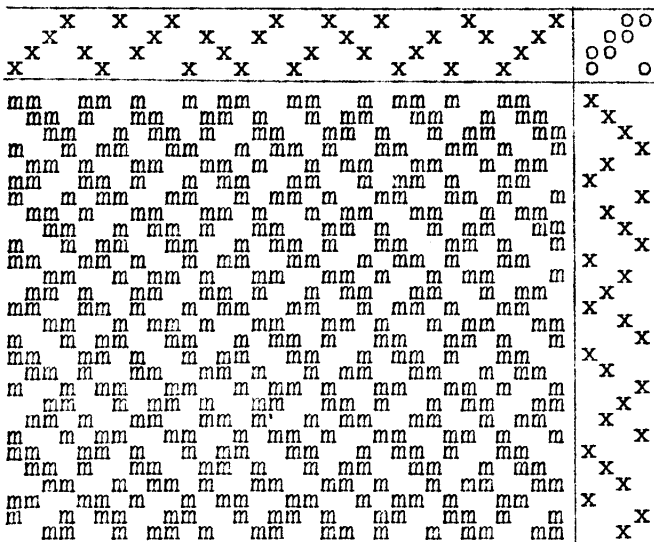


Fig. 4

But here the difference between the NE-SW and NW-SE directions is much less noticeable until we tilt the page and look at the draw-down from different angles.

The same of course will happen when we look at the fabric: it will show either wavy diagonals, arrow-heads, or small distorted diamonds, depending on the angle.

With longer diagonals the effect of distorted diamonds becomes predominant, but the other two components are still visible. The draft in fig.5 has a sequence of +5-4, and a repeat of 36.

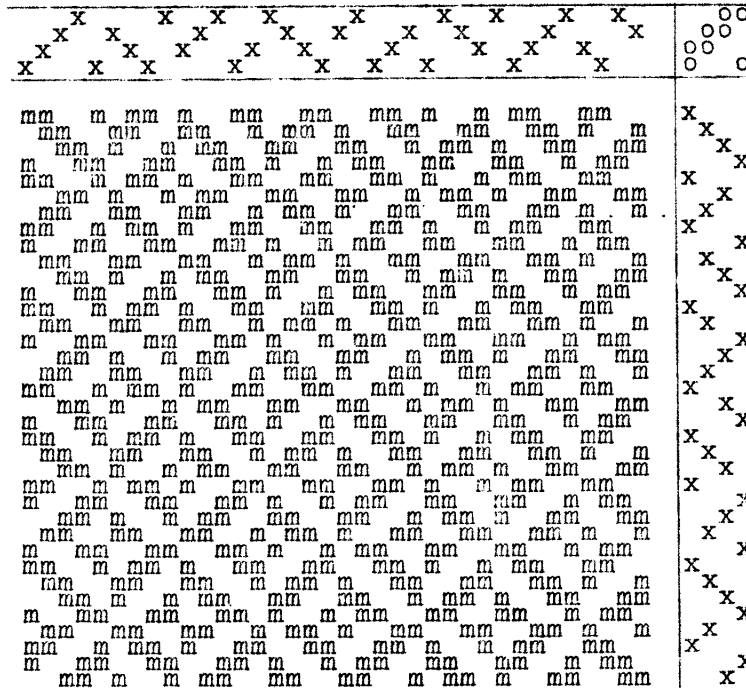


Fig.5

All drafts described so far have a bias even if it is very faint because the length of LH diagonals is not the same as the length of RH diagonals (or "+" and "-" in threading). To produce a

more balanced draft we must use a sequence with the same number of heddles in the two directions of short diagonals, for instance: +4-3+2-4+3-2 (fig.6). We have 9 heddles with sign "+", and the same number with "-". The repeat here is 18.

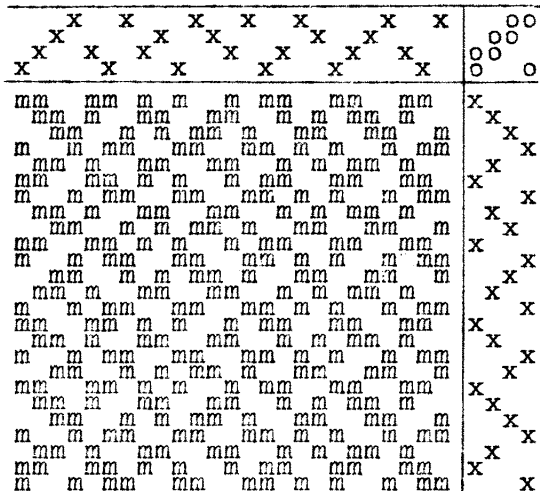


Fig.6

We have no space for practical projects in this issue; we shall have one more article on this subject very soon.

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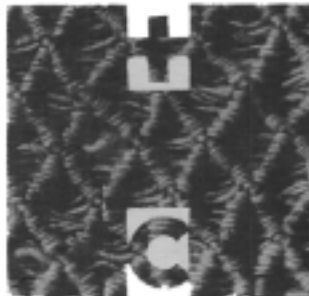
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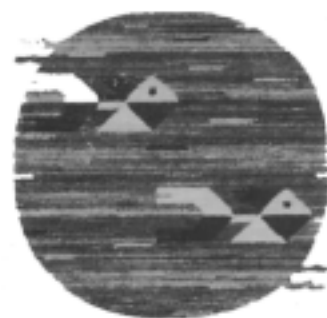
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