CROSS • WEAVE

Strangely enough this old weave acquires new interest in our so called modern weaving. This is because it gives us a freedom of choice in the matter of setting the warp. As we all know, there are two distinct limits of making an "open" warp, i.e. a warp with very few ends per inch. The first limit is set by the drawing-in of the edges. When we have too few ends of warp per inch, the take-up on the weft is much too high. The wefts winds around the warp without a similar action of the warp taking place. Therefore, unless we weave at a very slow rate, leaving plenty of weft in each shed, the edges will be drawn-in to a point where further weaving will be impossible because of the breaking edges. The second limit is encountered when in the finished fabric the weft slides along the warp either in washing or even when the fabric is being exposed to the normal tear and wear We are only too familiar with spectacular modern fabrics which seem. to desintegrate under their own weight.

Thus, when we try to make a light fabric with comparatively heavy yarn, we can not go below a certain sett of warp - at least not with normal weaving techniques.

But there is a whole class of weaves, to which the rules governing the sett of warp (see MW 8/1, 19/3, 28/1) do not apply. These weaves are called Leno in power weaving, and Cross Weaves in handweaving.

The general principle of all Cross Weaves is that the ends of warp are not parallel to each other, but that they "cross" each other at regular intervals. Fig.1 shows the simplest case: the first pick of weft (C) goes under warp-end A and over end B. Then before the next pick of weft is made, the two ends are crossed, or twisted around each other. They really make only half of a turn. They are kept in this position when the second pick of weft (D) is made. This pick goes over B and under A. After the second pick the ends of warp are twisted in the opposite direction (or untwisted), and this is the end of one repeat of our weave.

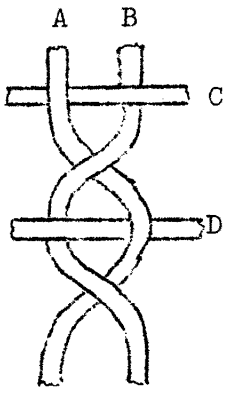

Fig.1

So far we are not concerned with the method which will produce the twist. For that matter there are several methods, of which four can be used by a handweaver. But before we go any further we must say a few more words about the cross-weaves in general.

The weave shown in fig.1 is the basic cross-weave, properly called Gauze. The name should not be confused with so called Gauze fabrics, usually woven in tabby reinforced with some sort of size

(glue, starch, etc.). These are really imitation gauze, and have nothing to do with cross-weaves.

If one repeat of gauze alternates with plain tabby (always an odd number of shots of tabby) as in fig.2, the weave is called Leno. Here again we have confusion, because in industrial power-weaving all cross-weaves are called Leno, and many hand-weavers follow the industrial terminology. Then we have also the "Mock Leno", which is another imitation either of Gauze, or of Leno.

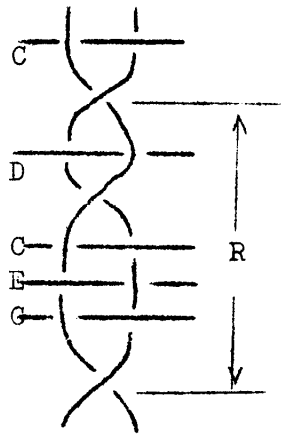

Fig.2

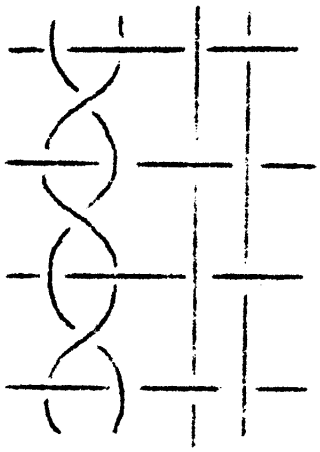

Fig.3

Not all the warp-ends must be crossed in weaving. We may have for instance one pair crossed, and the next woven as plain tabby; or several repeats of gauze may follow several repeats of tabby. Such a weave is (or rather has been) known as Pickets. Fig.3 shows the simplest case of Pickets. Finally Leno and Pickets can be combined so that we have squares or rectangles of Gauze on a background of tabby. The old English name for such a weave is Riddles.

Gauze, Leno, Pickets, and Riddles are four cross-weaves which can be made on a four-harness-frame loom. We shall limit ourselves in these articles to the cross-weaves for four frames, because the higher weaves of this class are rather difficult to present on paper and still more difficult to weave. The weaver who will succeed with the technique described here will do well to study Murphy's "Art of Weaving" out of print but available in public libraries.

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Of the four above mentioned methods of crossing warp ends, we shall describe here only one - in our opinion the easiest and presenting more possibilities than any other, but first we shall enumerate all four:

1-st. Cross weaves by pick-up. This gives us a complete freedom of weave and pattern, but is so slow that it cannot be seriously considered except for making narrow borders on large articles. Many weavers are quite familiar with this method.

2-nd. Traditional method which requires half-heddles (doups), and plain heddles (standards) to cross the ends. It has been described several times, recently in the Handweaver & Craftsman. It is a very good method but with four frames gives only Gauze or Leno.

3-rd. A variation of the above method (without "standards") which we shall describe presently.

4-th. Industrial methods with patent steel heddles. These heddles fit hand looms as well. They are rather expensive, and from the point of view of a handweaver hardly superior to the classical doups and standards.

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The doups are loops of fine thread slightly longer than half the length of a wire or steel heddle. The material of which the doups are made is of prime importance. They should be strong, resistant to friction, but at the same time pliable. Ordinary sewing thread No.40, doubled - is quite satisfactory. Two threads can be twisted together on a spinning wheel, the direction of twisting opposed to the twist of the thread. For the first experiments about 100 heddles will do. We shall need therefore close to 40 yds of the double thread. The thread is cut first into pieces about 6 feet long. Each piece is hung from a nail with a small weight tied to the lower end. Let it hang for a minute or so until the weight stops spinning around. This operation is necessary to remove the excessive twist which otherwise would result in kinks and snarls in the finished doups. Then we drive two 2" nails in a piece of wood 6" apart, and make doups around these two nails. Each doup will be about 6" long.

To weave gauze or leno we do not need any wire heddles either on the 1-st or the 2-nd frame. For the time being we shall not use the second frame at all. All doups are hung on the top bar of the first frame. They are not threaded on the bar, but simply looped around it.

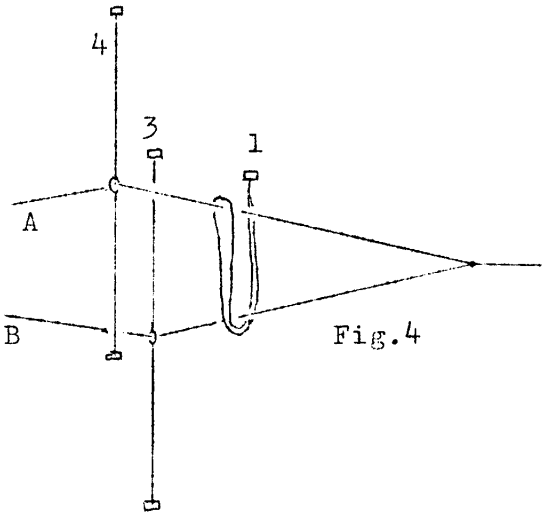

Fig.4

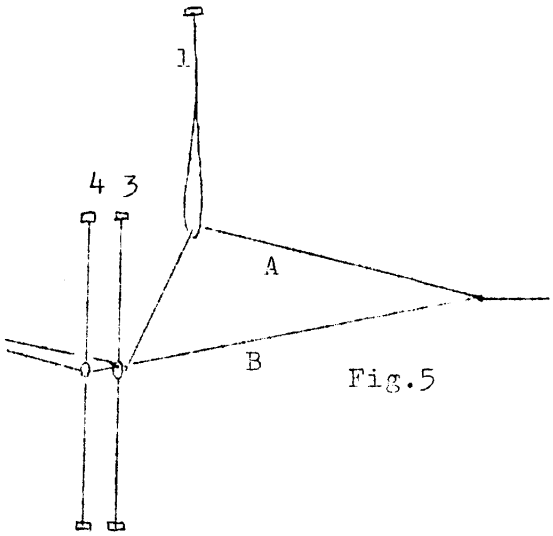

Fig.5

Now we prepare a warp of plain or mercerized cotton No.10/2. We can set it at 16 ends per inch, and use No.8 reed. The threading is done as follows (see fig.6, next page). In each repeat of gauze we take first the end A and pass it through the heddle on frame No 4, and then through a doup on frame No.1. Then we pass the threading hook <u>to the left</u> of the doup (which is already threaded), and

through a heddle on frame No.3 to the right of the already threaded heddle on No.4. This is one repeat of Gauze. It is absolutely essential that both warp ends of the same repeat go into the same dent of the reed. In the same way we thread all warp ends.

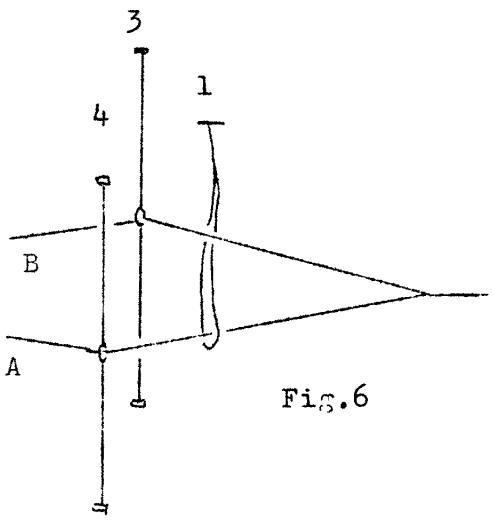

Fig.6

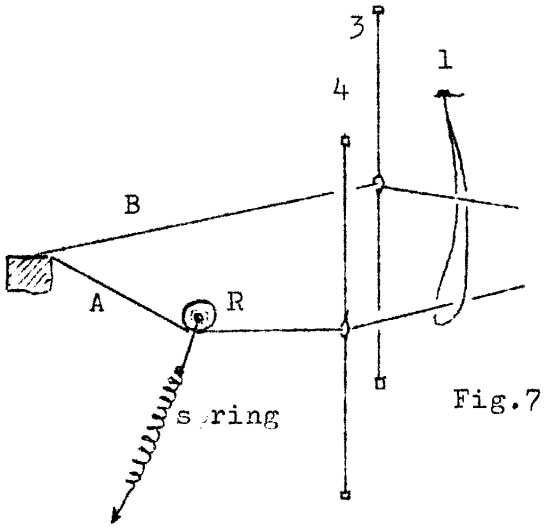

Fig.7

Before we start making the tie-up we must understand how the whole set-up is going to work. To get the first shed of Gauze (fig.4) we must raise frame No.4, and sink No.3, because this is one of the tabby sheds. But we must also lower frame No.1 to get the doup around the warp-end B. Otherwise the doup would pull B up, and A down, so that we would have no shed at all. The tie on frame No.1 must be a little shorter than the tie on No.3. Thus our first treadle will be tied to sink frames 1 and 3, and raise No.4.

The gauze shed (with twisted warp ends) is shown in fig.5. Both frames 3 and 4 are sunk, and No.1 raised. This shed is always the one which gives us trouble. It is clear from fig.5 that to get a good shed we would have to have the warp-end A much longer than B. We shall come later to this problem, but we may say here that this is the reason why most of the doup leno sheds hardly open at all. Our second treadle will be tied so as to sink No.3 and 4, and to raise No.1.

Two treadles are enough for plain gauze. To weave tabby between shots of gauze, we must have a third treadle which will produce the second tabby shed (fig.6). Here No 3 is raised, No.4 sunk, and No.1 half way between the two. This "neutral" position is a hieved by making the tie about 2 to 3 inches longer than normal ties. The third treadle then will sink No.4, raise No.3, and half-sink No.1 .

Fig.8 shows the whole tie-up for the sunking shed, and fig.9 the tie-up for rising shed.

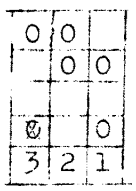

Fig.8

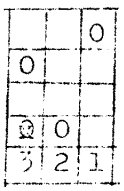

Fig.9

To weave plain tabby we shall treadle: 1, 3. For Gauze: 1, 2. For Leno: 1, 2, 1, 3, or:

1,2,1,3,1,3, or 1,2,1,3,1,3,1,3, etc.

Before we can try more complicated weaves, we must concentrate on the adjusting of the tie-up, so as to have all sheds open, and clear.

We start with treadle 3. Adjust frames 3 and 4 so as to have good tabby shed, and then No.1 so that the doups will not tangle in the shed (the frame No.1 too low), or pull the lower part of the shed up (the frame too high).

Then comes treadle No.1. We adjust first frames 3 and 4, and then shorten the tie on No.1 until the top bar of the frame nearly touches the open shed. Even so the doups may tangle in the shed. Increase the tension of the warp, and press firmly on the treadle. If this does not help, try treadle 2 before treadle 1. Treadle 2 should clear the shed (of course we do not throw the shuttle on this treadle). If even this does not work, the doups are too stiff. Try to soften them by forcing the shed No.1 open with fingers if necessary. Keep changing sheds for several minutes until shed No.1 becomes clear, or until we decide that the doups must be replaced with softer ones.

Finally we come to the shed No.2. First we adjust ties to frames 3 and 4. They must be both on the same level. Then we get No.1 to rise quite high - higher than normal. Even so the shed will be very poor. To get a better shed we must provide the extra length for warp-ends A.

To do this we need an extra roller which would pull down all warp-ends threaded through frame No.4 (fig.7). We can make this roller from an old broomstick. Cut a length equal to the width of the reed. Drive one nail (1½") in each end of this roller, so that about ½" will project. Then tie one screen-door-spring to each nail. Tie a length of string to the other end of each spring.

Now we open shed No.3, pass the roller through the back shed, so that both ends of the roller will project from the warp to the left and right, and tie both springs to the loom frame. There should be a fair amount of tension on these springs.

To provide the extra length of A, we shall weave plain tabby for several inches. There will be more take-up on ends B, since they are not pulled down by the springs, and consequently the length of A will increase when compared to B. If we decided that this process went far enough, we can try again to open shed No.2. If "A" (see fig. 5) rises but it pulls up "B" at the same time, then the difference in length between A and B is not sufficient - keep on weaving tabby. If the shed hardly opens, and the roller R (fig.7) does not rise, the springs are too tight - release some of the string at the lower end of each spring. If, finally the roller rises, but the shed is still poor, then the tension of the warp is too high. Release it.

This is the most tricky part of cross-weaving, and we should spend quite a lot of time on experiments at this stage, until we get all sheds properly open. With a good loom there is no reason why we should not succeed. The best looms for cross weaves are double-tie-up (Swedish), or counterbalanced. Very light jack-type, and table looms will give only a very poor shed.

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