

Leno Weaving and Design

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(Continued from May issue, p. 201)

Designing for Figured Three-End Leno Weaving with Slotted Steel Doups

The slotted steel doup was developed to weave fancy leno without the use of multiple doup sets. Formerly these patterns were woven on a single set of cord doups by taking advantage of the flexibility of the cord doup, and having the doup ends lifted on the open pick to form leno, or left down to form plain weave. With the plain steel doup, this was not possible due to the rigidity of the doup needle. The slotted steel doup is adaptable to patterns which formerly were produced only on cord doups or on a greater number of plain steel doup sets.

The principles of design in three-end leno have previously been described and illustrated in Figs. 5 (a), 5 (b), and 5 (c) in the *THE MELLIAND*, April issue, 1930, p. 33. The pattern Fig. 5 (a), consisting of a small block effect, is formed by using two back harnesses, one for each change in the pattern. Fig. 20 (a) illustrates the formation of the open shed. The doup needle (a) is lifted by the second standard heddle (e). The front standard (d) remains down and leaves the slotted wing of the doup needle open. The crossing end (c) is shown lifted by the back harness (h). This is the position for forming leno. Figure 20 (b) shows the doup in open shed position with the doup end (c) lowered in the slotted wing of the doup needle. This is the position for plain weave. The crossed shed is formed by raising the front standard with all ground and back harness down in exactly the same manner as described for the slotted doup in *THE MELLIAND*, April issue, 1930, p. 31, Fig. 2 (b).

Three-end leno weaving is in some respects simpler than two-end leno. It will be remem-

bered that in two-end leno the ground thread must be brought to the center of the shed for every pick where there is a direct crossing from open to cross, or from cross to open shed. This requires a jumper mechanism. In a regular three-end leno (one end crossing two ground) the ground ends weave plain and therefore come level at the center of the shed after each pick, thus permitting the crossing ends to cross over without the use of a jumper. The regular three-end leno is a very firm structure in which three ends are securely entwined with each other. It resembles the two-end leno, but has wider possibilities in patterns formed from plain weave and leno weave combinations because of the greater bulk of yarn in each dent of the reed.

Fancy Three-end Leno Patterns

Fig. 21 (a) is a fabric woven on slotted steel doups by the three-end leno principle with approximately 51 ends of 60's two-ply combed cotton yarn, and 36 picks of 150 denier rayon per inch. The pattern is a 12-step diamond effect repeating on 48 dents or 144 ends. As is shown in the drawing-in draft, Fig. 21 (b), 12 pattern harnesses are used with two ground harnesses. Two sets of slotted doups are used, the second set being added to avoid crowding of the heddles, but in principle only one set is required. All doup ends are drawn from the right and in addition to being drawn through the back harness are passed through a slotted heddle just in front of the ground heddle. The purpose of this heddle is to relieve the ground ends of the strain they are ordinarily subjected to on the crossed shed. The slotted heddle has a slot extending from the mid-point downward, and corresponding in length to the opening of the shed. It is lowered on each crossed shed and raised on each open shed. In the raised position, it

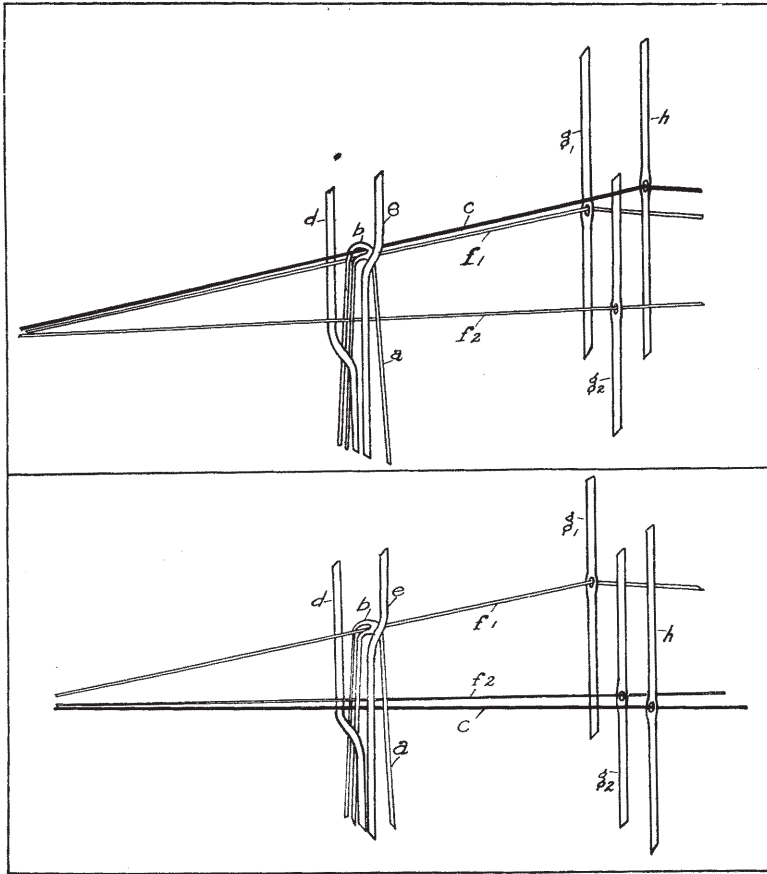


Figure 20 (a)

Diagram of Slotted Doup in Open Shed Position. Doup End Raised.

Figure 20 (b)

Diagram of Slotted Doup in Open Shed Position. Doup End Lowered.

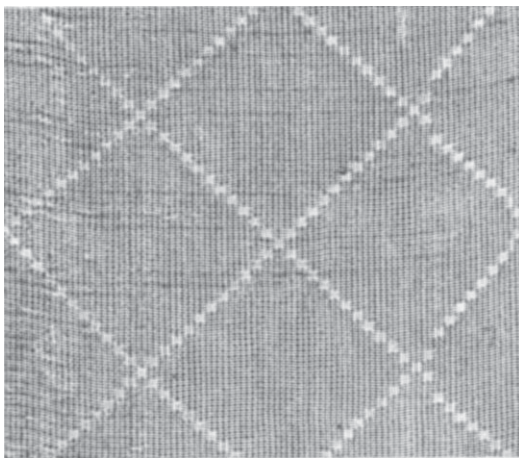
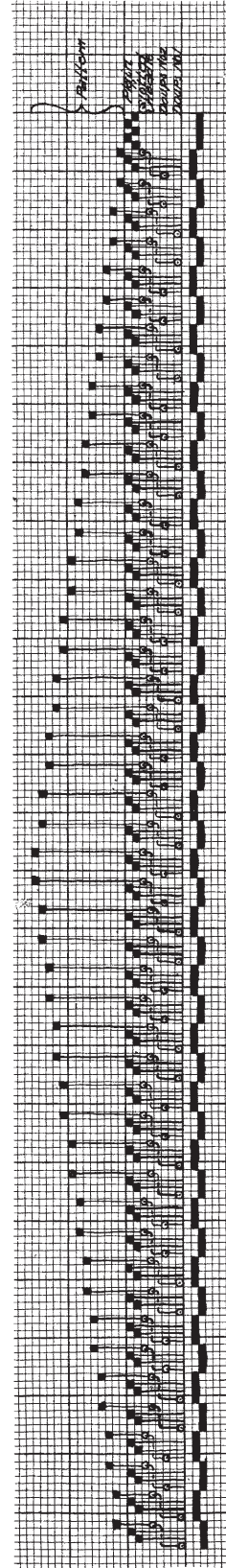


Figure 21 (a)

Fancy Three-end Leno Diamond Pattern.

Figure 21 (b)
Drawing-in Draft for Figure 21 (a).



permits the crossing ends drawn in the slot to be in either the top or bottom shed, since the principle of patterning with three-end leno depends on this condition. Both doup sets are mounted with the slot to the front and the ends are drawn in as for right-hand douns.

pick for leno ground and left down according to motive for forming the figure in plain weave. All pattern harnesses are down on crossed picks.

Fig. 22 (a) illustrates another fancy three-end leno fabric woven by the same draft as

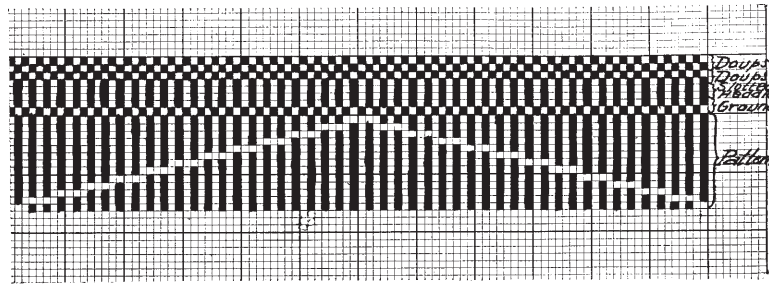


Figure 21 (c)
Chain Draft for Figure 21 (a).

Fig. 21 (c) is the complete chain draft on 96 picks for weaving Fig. 21 (a). Reading from the front or left, four levers are used for douns. These are operated in plain weave order. Two levers, 6 and 7, are used for the slotted heddles. These are lifted on open picks and lowered on crossed picks. Numbers 7 and 8 are used for the ground ends. These levers are operated in reverse order to the douns. The back or pattern harnesses, 9-21, are lifted on every open

Fig. 21 (b). This variation is possible on the same number of pattern harnesses because there are only 12 changes in the pattern. Fig. 22 (c) is the chain plan, which shows clearly how the new diamond pattern is developed from the first.

In Fig. 23 (a) is illustrated a fancy leno

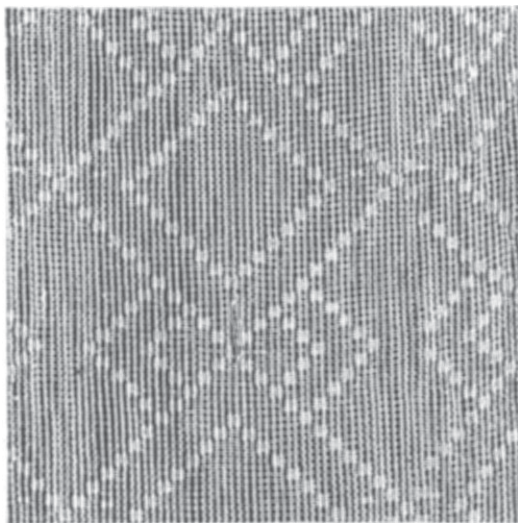
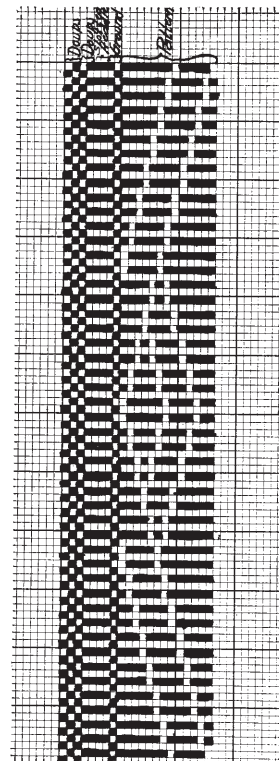


Figure 22 (a)
Fancy Three-end Leno 12-step Diamond Pattern.

Figure 22 (c)
Chain Draft for Figure 22 (a).



fabric repeating on 144 ends and 122 picks. This pattern is also a 12-step symmetrical design and was woven with the same harness draft as that used for 21 (a) and 22 (a);

comparison with other weaves, very large designs may be produced on dobbies. Indeed the pattern in Fig. 22 (a) is much more elaborate

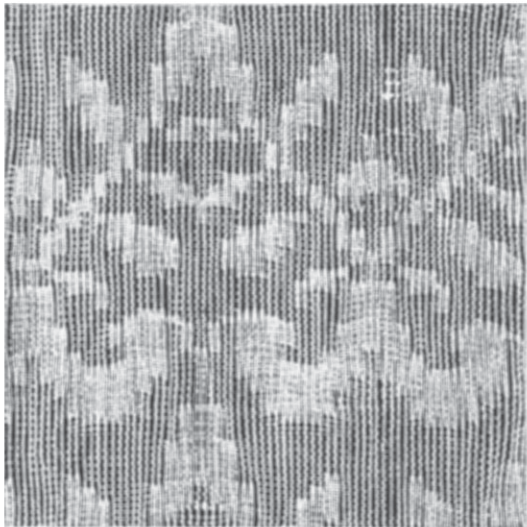


Figure 23 (a)
Fancy All-over Three-end Leno Pattern.

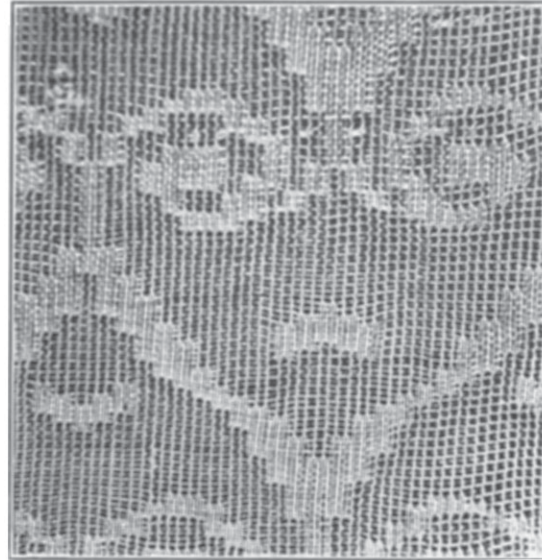


Figure 24 (a)
Fancy Three-end Leno Scroll Pattern.

the increased size of the design is obtained in the filling. Fig. 23 (c) is the chain draft. The only difference between Fig. 23 (c), Fig. 21 (c), and Fig. 22 (c) is in the increased number of picks and the manner in which the pattern harnesses are idled on the open picks.

Fig. 24 (a) is an additional design with 144 ends and 88 picks forming one repeat. While it does not resemble a diamond in form, it is symmetrical and was woven from the same

than any which could be produced in ordinary woven structures other than the leno. The pattern range is widened by the fact that only one end in a dent may be operated as a pattern thread. Yet by properly manipulating the pattern thread, the effect produced by the other two threads is controlled also. Leno dobby patterns, therefore, resemble effects which are ordinarily woven on the jacquard.

A leno pattern with a repeat six inches

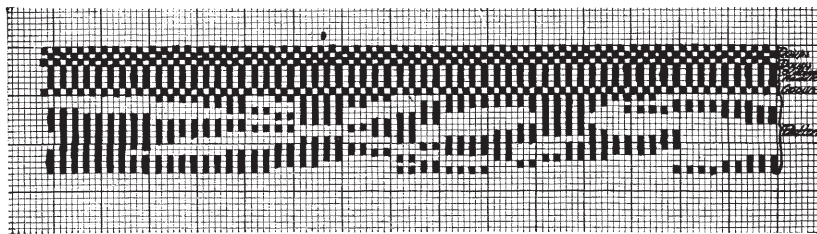


Figure 23 (c)
Chain Draft for Figure 23 (a).

drawing-in draft as Fig. 22 (a). The chain draft is given at Fig. 24 (c).

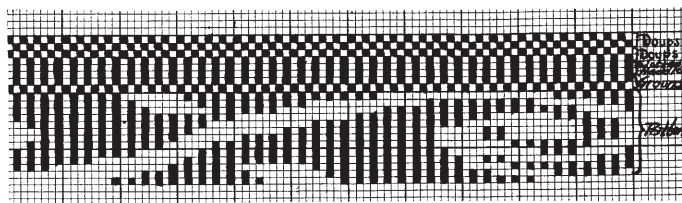
The series of patterns shown are examples of the flexibility of the slotted steel doup. Since the leno structure is relatively open in

each way is shown at Fig. 25. The warp is 100's two-ply combed cotton yarn, and the filling 150 denier rayon; it is constructed with approximately 60 threads and 36 picks per inch. This is an example of highly advanced

leno weaving and represents a class of fabrics which rival the beauty of lace in curtain materials.

work so that the warp stands about $\frac{1}{8}$ inch from the race-plate. The back or pattern harnesses should be set level with the ground

Figure 24 (c)
Chain Draft for
Figure 24 (a).



In laying out designs for leno and plain weave combination effects, the designer should strive for a balanced design. If the warp

harnesses or slightly lower. The doup standards should be set so that the eye of the doup needle is about $\frac{1}{2}$ inch below the ground ends

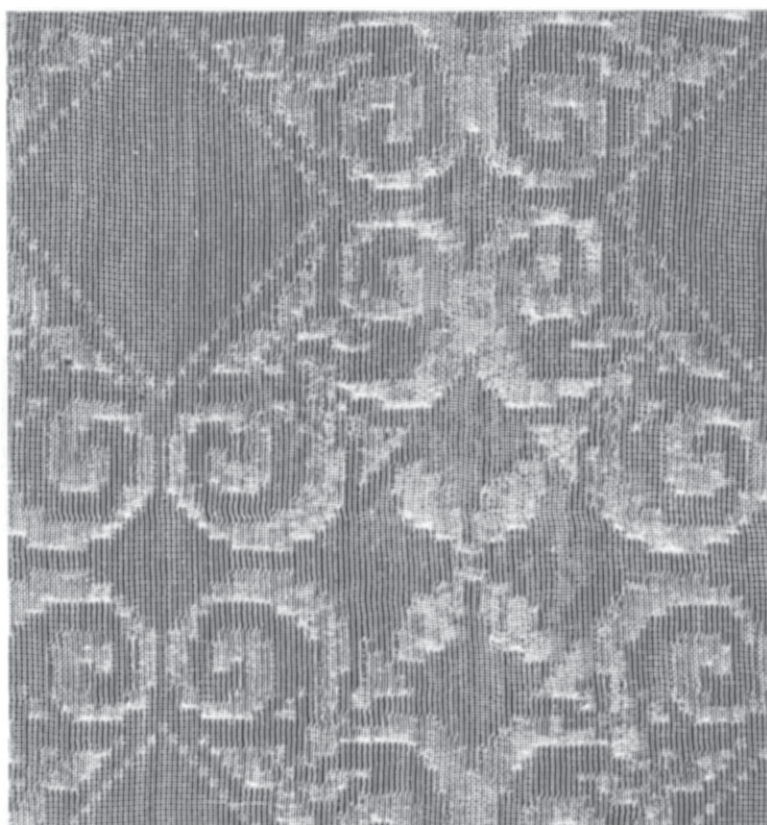


Figure 25
Fancy Three-end Leno Quadri-symmetrical Pattern.

forming one part of the repeat has a greater proportion of leno to plain, than the warp in another section, the take-up will not be uniform and slack ends will naturally be the result.

Settings

In warping up a loom to weave leno, the ground harness should be set as for ordinary

when the ground harnesses are level. The low setting of the doups makes it necessary to give the standards a greater lift in order to form a shed sufficiently wide to permit the shuttle to pass freely. This is gained by connecting the doup standards near the top of the dobby levers.

In leasing a leno warp for marquissette, the

ground ends should pass under the back lease rod and over the front or oval lease rod. The crossing ends pass over the back and under the front lease rod. This insures a free movement of the crossing ends when released by the easer on the crossed shed, since they follow a straight line from the easer to the back harness. In leasing a three-end leno warp, the first lease rod should be inserted with the back harnesses and one of the ground harnesses up. The second rod is inserted with the back harness, the other ground, and the second standard harness raised.

The slackener should be set so that it has ample room for slackening the crossing ends. In no case should the crossing ends be brought against the whip roll carrying the ground ends, as this puts additional strain on the crossing ends and prevents the easer from functioning to the best advantage. The slackener should be set to begin releasing the yarn as soon as the ground and back harnesses become level. The amount of yarn released may be controlled by properly adjusting the connecting levers.

Selvages

Due to the relatively small amount of filling in a leno fabric, the weaving of a satisfactory selvage is often hard to do. Selvages have a tendency to spread and vary in width. It is

generally the practice to run the selvage from spools, and the building of a perfect selvage begins with making the spool. The heads should be perfectly true and the ends built uniformly against them. Very satisfactory results have been obtained by using a core and beaming the spools with paper, after the silk method. Uniform tension on the selvage spools is of course essential to weaving a perfect selvage.

Of equal importance is uniform tension on the filling. Too little tension on the filling will cause the selvage to spread. It sometimes occurs that a full bobbin will produce a wider selvage than the same bobbin will produce when it is almost exhausted, due to difference in drag. In this case, tension should be applied in the shuttle in the form of a bristle, flannel, or fur.

Reeds

The open leno effect requires a fairly coarse reed, although finer reeds are sometimes used with every second dent left empty. Defective cloth may be formed in which the spacing of the groups of warp threads will not appear uniform. A reed with too much air space contributes toward this defect, but is not a cause. Lack of uniformity in the spacing of the warp ends may usually be traced to lack of uniform lifting of harnesses, and bent or binding doup needles.