# "Cross Shot" Elastic Webbings

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By means of two shuttles, crossing over each other, it is possible on webbing looms to weave two webbings in one operation over each other and at the same time. While it is possible, it is rarely practiced in webbing mills because any errors in the weaving cannot readily be noticed in the lower webbing by the weaver.

Quite different are the conditions, when a tubular or a double webbing is made by two different filling systems. The production of the loom can be greatly increased by using one shuttle for the upper and another shuttle for the lower fabric. In order not to strain the picking mechanism unevenly one shuttle crosses from right to left and the other from left to right at the same time. Hence the name "cross shot." For such "cross shot" webbings both straight-two-spool-shuttles as well as bowed-two-spool-shuttles are used. Rarely are three deckers used, on account of their unhandiness and difficulty in attending.

This method of making webbings is found very frequently in the manufacture of elastic webbings. These are divided into two classes, namely, those that are made with a single ground warp and those that are made with two ground warps. A great many of regular elastic narrow fabrics, such as suspender, garter and belt webbings as well as fancy and elastic velvet webbings are made with the aid of the cross shot method and weaves, which will be explained hereafter.

The manufacture of "cross shot" webbings requires that a double shed be formed. Through the upper shed the top shuttle is passed, whereas the bottom shuttle passes at the same time through the lower shed. Hence, three types of sheds are differentiated between: upper, middle and lower shed. The upper warp will interlace between the two upper sheds and the lower warp will operate between the two lower sheds. In this way, really two individual webbings are formed, which are united by a binder warp. The elastic rubber warp consisting of bare or covered rubber strands, together with the stuffer or filler warp are introduced and woven-in in such a way that they are not visible on either side of the woven webbing; this rule applies to all elastic webbings.

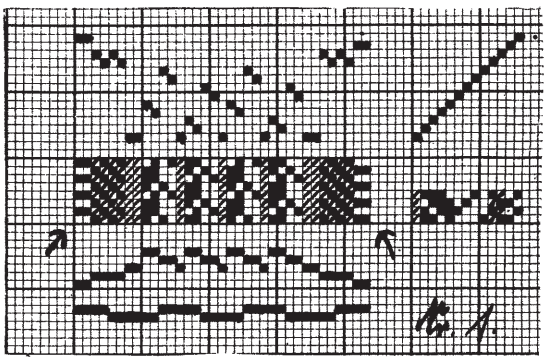


Figure 1

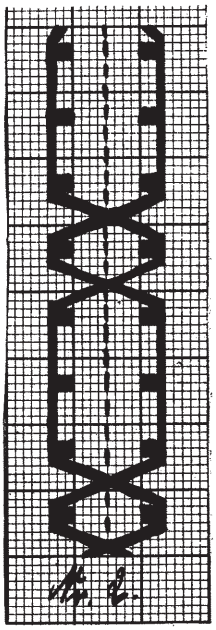


Figure 2

For a better understanding of the designs shown with this article, it must be stated that the top warp interlacings are filled in completely, the squares representing the middle warp are indicated by a diagonal line, and the lower warp remains unfilled.

## Actual Examples

Design 1 represents the weave construction of a "cross shot" webbing, where the upper and lower warp interlace directly and right through. The middle shed position is not used. The cross-section No. 2 shows plainly that such a method is not desirable in all cases, as the resultant webbing is somewhat loose in its construction. The rubber ends, of which there are two at each selvage, remain in the middle position. Somewhat peculiar is the selvage construction; it is only interlaced by the upper shuttle, while the upper shuttle filling and the lower shuttle filling enclose the filler warp and pull the selvage downward. In this manner a very nice, round and cord-like selvage is shaped.

The upper ground weave is a four-harness warp twill. For the lower ground weave a filling twill is used in order to bring the warp to the outside of the webbing.

The warp arrangement is as follows:

2 ends lower warp
2 ends upper warp
1 end rubber etc.

In the reed, every rubber strand is reeded with its accompanying lower and upper warp ends as well as filler or binder warp ends, the rubber end in the middle wherever possible.

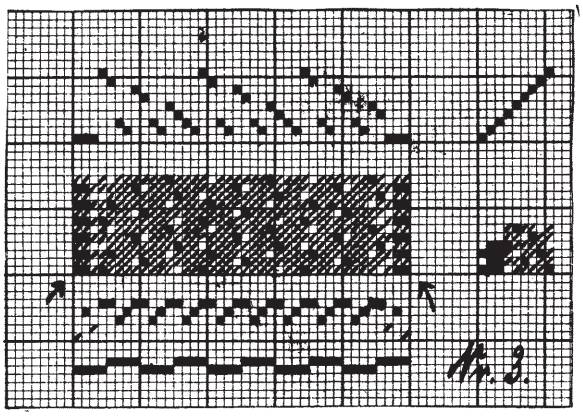



Figure 3

The next design, No. 3, shows a "cross shot" webbing, of a greater repeat, which is decidedly firmer in construction, since the ground ends operate once in the upper shed, twice in the middle shed, and once in the lower shed. A six-harness satin with move numbers 1,3,5,2,6,4 forms the main body weave. Both sides of the webbing show a six-harness filling satin. The warp arrangement is two ends binder warp, one end rubber warp and one stuffer warp. The selvage is again rounded, and in such a way that the under pick wraps around a wire and returns at once, while the overpick interlaces a rubber strand and a wire, which are brought to lie at the very edge and in this way form a braided edge. The cross-sectioned drawing No. 4 shows the position of the individual ends in a repeat and the course of the individual picks.

## "Cross Shot" Double Webbings

Decidedly stronger and firmer are the elastic "cross shot" double webbings. These narrow fabrics have this advantage, that the two sides can be woven in two different colors, i.e. one side blue and the other white. The rubber and stuffer ends lie between the faces, which are held together by binder threads. In design No. 5, the weave layout is shown for this type fabric, in which both sides are woven in plain weave. The upper warp ends weave in the top and middle sheds

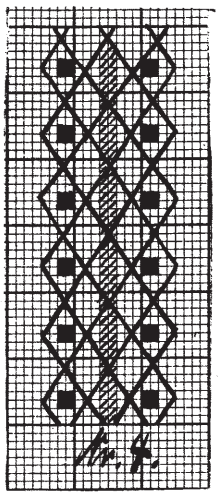
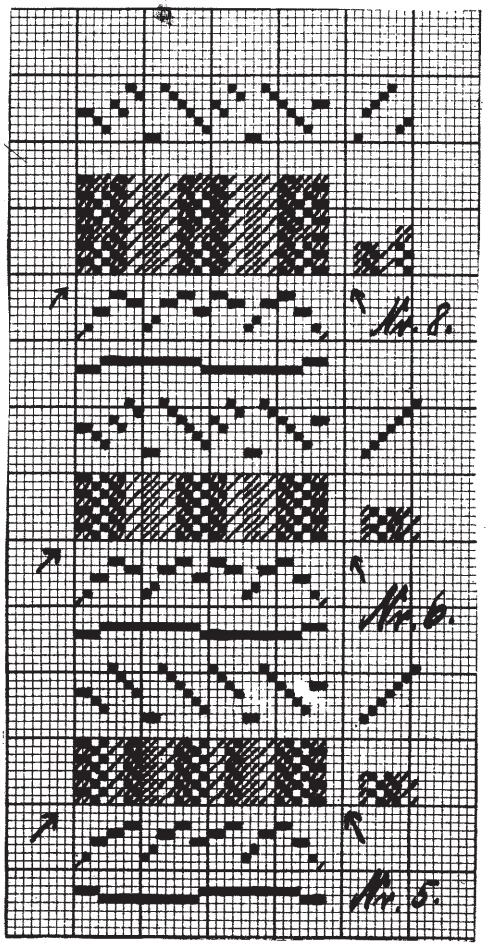



Figure 4

and reverse. The lower warp ends weave in the lower and middle sheds and reverse. The rubber and filler




Figures 5, 6, and 8

yarns remain only in the middle shed, whereas the binder threads interweave between the top and bottom sheds and reverse. The sequence of the warp ends are: two binder yarns, two ends upper warp, two ends lower warp, one end rubber, four ends stuffer, two ends upper warp, two ends lower warp, and two binder yarns. The reeding is done the same as described before. The edges are formed by a rubber end and one wire, woven in by the upper shuttle.

In the design No. 6 the warp arrangement is changed only, which is as follows: two binder ends, two ends upper warp, two ends lower warp, one end rubber, one end stuffer, two ends lower warp, two ends upper warp, and two binder ends. With such an arrangement of the ends, a complete hiding of the binder ends in the upper and lower warps is accomplished. The upper warp, which generally forms the right side of the goods with the upper shuttle, does not allow the binder warp to show through, because it is bound between two ends of the upper warp. It is a very disagreeable matter when with a two-color cross filling a third colored warp shows through the surface or face side.

Cross-section No. 7 shows the construction of this webbing designed with No. 5 and 6.

The possibilities of technical effects in cross shot double webbings with comparatively simple means are shown in Design 8. The same type fabric as in No. 6 is used, only that the binder warp in a six-pick repeat remains in the middle shed twice in succession. At these places no connection exists between the top and bottom warps, hence a ribbed or wavy surface is the result.

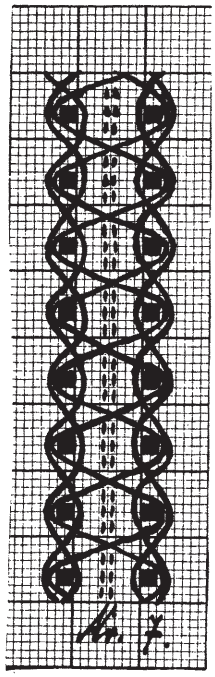


Figure 7

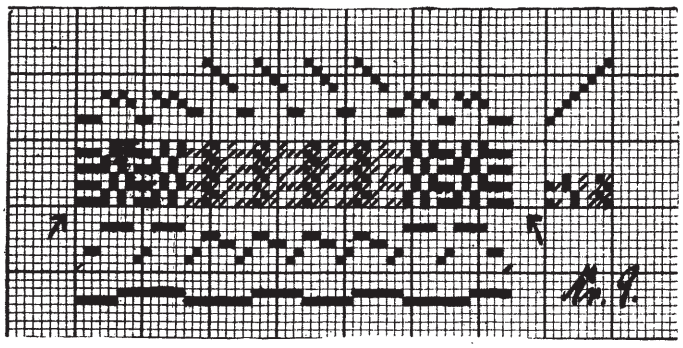


Figure 9

Design 9 gives the weave formation for a cross shot elastic hollow webbing. The hollowness is formed by the top and bottom fabric, without being bound except at or near the edges. The top fabric weaves plain. The bottom fabric weaves a two-pick warp rib weave. The rubber and stuffer yarns operate with the bottom fabric in the lower and middle shed. The edges operate through all three shed positions by means of a two-pick warp rib weave. In this way a very firm edge is obtained. The cross-sectional drawing, Figure 10, shows the position of the various yarns. The upper webbing puckers up after the goods leave the loom because it is not bound into the lower fabric, which carries the rubber and stuffer threads.

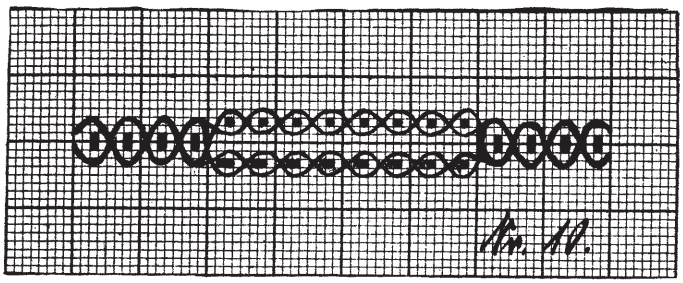


Figure 10

Figure 11 is a design of a similar fabric, which is constructed on the same principles, only that an upper and lower fabric produces a puckered effect.

The above elastic cross shot webbings are only a few examples of what can be done along such lines. Every practical mill man can use them in his own way and obtain many different effects to complete his line of samples and to suit particular requirements. It was the object here to discuss the methods only, which are required to get the cross shot effects. Such webbings can be enhanced by figure work with warp and filling or printing figures on them.

The various designs also show the harness arrangement and the cam positions which are worked out according to practice. For the formation of a double shed in cross shot double webbings, of course, two-eye heddles are necessary in which the two heddle eyes are spaced a certain distance apart. The top warp ends would be drawn through the upper eye and the corresponding bottom warp end through the lower eye. If the harness is up it corresponds to a top shed position for the upper end and a middle shed position for the lower end. If the harness is down then the upper end is located in the middle shed and the lower end in the bottom shed. In this manner a number of harnesses can be saved. In the course of time designers have gotten away from this method because it restricts them too much as far as variations are concerned. In the interest of manifoldness and modern flexibility of pattern, most designers arrange a separate system of harnesses for each warp or set of warp yarns.

By means of the cross shot arrangement a great saving in picks is accomplished which, of course, increases the production of the loom. The selection of textile yarns and combinations must be undertaken cautiously for elastic cross shot webbings. The manufacture of such webbings requires well trained weavers because it will be found that every narrow webbing weaver cannot cope with them.

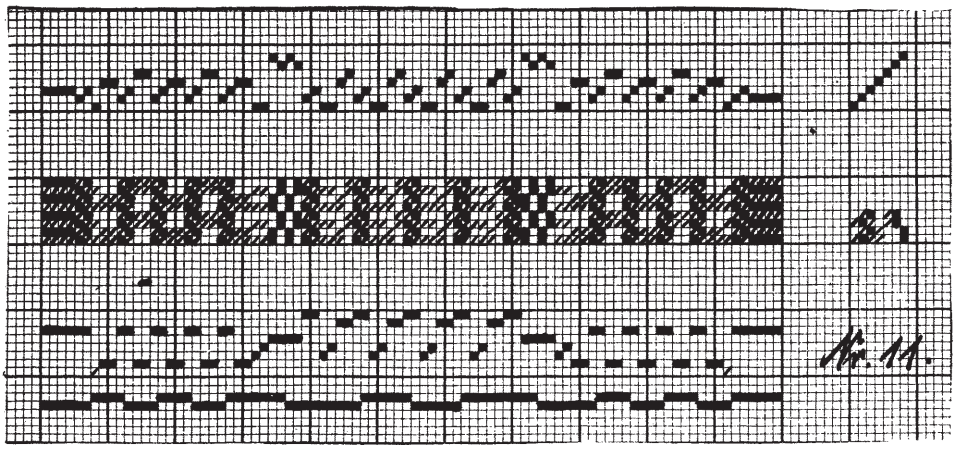



Figure 11

Aside from the ordinary cross shot webbings, discussed above, there are other webbing products that can be woven with this method, for instance, elastic and unelastic double velvet ribbons, edgings and millinery trimmings, etc. These will be discussed at a later date.