

When A Single Harness Simply Isn't Enough

Double Harness Techniques
to
Produce Complex Patterning

by

Sara von Tresckow



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Drawloom in Neumünster, Germany
"Tuch und Textil Museum"

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To
Produce Complex Patterning

Written by
Sara von Tresckow

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Sara von Tresckow
Fond du Lac, WI

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FOREWORD

The loom pictured on the cover is, to me, an old friend. Shortly after I began to weave on a rigid heddle loom in the late 1970's, my husband suggested we visit a nearby textile museum. At the time we were living in Osterrönfeld – a village of 3000 people on the outskirts of Rendsburg, Germany. Rendsburg is located in the middle of the Kiel Canal that connects Hamburg on the North Sea with Kiel on the Baltic Sea. Neumünster is an industrial city to the south of Rendsburg – and Hans had attended grade school there. Neumünster had an early “Tuch” industry – felted woolen goods and their finishing. There was a textile school and museum still located there.

In the entry hall of this museum, at the time known as the “Textilmuseum Neumünster”, stood a magnificent drawloom. It was love at first sight – “when I get experienced in weaving, I want one of those”. At this point, the curator at the time – Klaus Tidow (textile archaeologist who worked with Karl Schlabow on replicating the Thorsberger Prachtmantel, also housed in this museum) began conversing with us. His first line was something like “I don't think your boys would really like to pull the cords for you.”

Over the years I remained fascinated with double harness looms. In 2003 went to Montana to work with Joanne Hall and subsequently set up a drawloom in my home – based on a standard 40 inch Lilla loom from Öxabäck and a Myrehed drawbridge with 50 pattern shafts and a custom extension.

The decision to undertake complex design with the drawloom rather than a dobbie loom was made after testing various fabric designs and concluding that the free patterning over a large surface without floats, if so desired, was more important to me than multi-shaft designs with selvedge to selvedge repeats.

Now that I work on both, as well as occasional experimentation on Jacquard looms, I would build that drawloom first all over again.

The purpose of this book is to fill a void. There has never been a comprehensive work in English that included several types of double harness looms and their operation. Rather than a collection of projects and patterns, this book is meant as a guide to either acquiring a drawloom or modifying an existing loom to create double harness patterns when desired.

The section on designing is meant to provide weavers with tools to create interesting textiles on their own. While tradition is important, double harness weaving opens up many possibilities to form a wide array of patterns, creative structures and unique textiles. There is a list of additional resources at the end of most chapters. It pays to learn the traditional ways first, but after that experimentation is definitely beckoning. I wish readers much enjoyment when setting up and designing for a double harness device.

The cover photo was taken in 2009 at the newly redesigned museum in Neumünster – now known as “Tuch und Technik” –

Web site: <http://www.tuchundtechnik.de/cms/>

Facebook: <https://www.facebook.com/TuchundTechnik>

Introduction

Double Harness Weaving

Double or multi-harness weaving occurs when pattern is inserted into fabric through the use of a device not included in the set of ground shafts (ground harness) on the loom, ground shafts being the set of shafts used to create the basic structure of the fabric. There are numerous devices and setups that fall under this definition – from simple sticks inserted into the warp behind the ground shafts to elaborate drawlooms. Use of a second harness allows rich, free form patterns to be placed into unique fabrics in a manner that single harness looms do not allow. Use of a second harness can produce fabrics with rich patterns that show no long floats (Damask). Use of a second harness allows unique and non-repeating designs to adorn what would otherwise be rather plain fabrics.

The concept of double harness weaving encompasses many structures, setts and appearances – from supplemental weft patterning such as the Swedish Opphämta or, patterned linens similar to the Perugia towels of Italy or Laotian silk fabrics to rich patterned damasks detailing scenes from the Bible as in the old Dutch and Belgian linens for the nobility. The patterned silks and velvets produced in Europe prior to the invention of the Jacquard loom around 1800 were all done on a variation of what is known as a drawloom – very slowly and with much labor involved. John Becker's "Pattern and Loom" (Becker, 1987) details several complex fabrics from antiquity which could not have been woven using a single set of shafts and shows how he built modified looms to recreate them.

Modern multi-shaft looms, including the most recent computer assisted dobby looms, have only one "harness" in that all the shafts work together – it is not possible to separate a group of those shafts to create a pattern distinct from the basic threading because placing warp threads through two of these shafts at the same time does not allow the shed to open. Single harness dobby looms produce loom controlled pattern, selvedge to selvedge very nicely. There are techniques for advancing and networked drafts that allow for non-repeating designs and considerable freedom of pattern. However, dobbies are not suited to free pattern placement and the type of detail and variation possible when using double harness techniques.

While historically weaving with a second harness has some rules and terms that are still applied today, we are also free to modify and invent new uses for this type of loom. This book will explore not only the various loom structures and modifications that can be used to develop complex patterning, but will also touch on principles of designing for double harness weaving.

What is a harness?

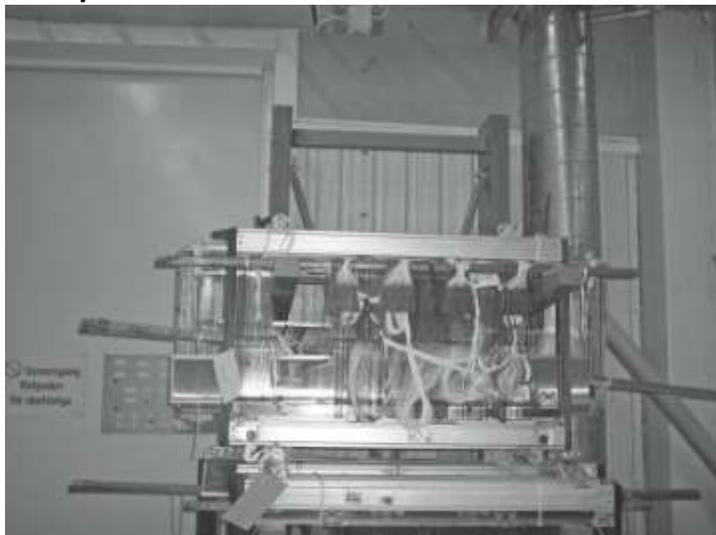
In weaving, the term harness is used to mean a group of shafts working together to perform a single function. On a horizontal loom with 8 shafts, all 8 shafts form the ground harness – those 8 shafts, working together, create the fabric according to the threading, tieup and treadling used by the weaver. In fact, those shaft frames together with the reed can be bundled and removed from the loom – with sufficient warp remaining – and stored on the wall or a storage rack. When that pattern and thread density are again desired, the "harness" is put back on the loom, the new beamed warp tied on behind the heddles, and the pattern reappears. This was done frequently by old time handweavers and is still used in industrial settings today. The cost of heddle frames and a reed is less than having an employee sley patterns that are used as part of standard production.

Today, the terms harness and shaft are often interchanged. Since the harnesses of old, hung on the wall, have gone out of favor with handweavers, it is felt that it is not of consequence which term to use. For new weavers setting up for a herringbone twill scarf on four shafts, it is probably of no great importance. When that weaver progresses to weaving on more complex equipment and considers a drawloom, suddenly "harness" takes on a new meaning.

Harnesses, pictured below, have been used around the world for both handweavers and mills, for professionals and home weavers. I once personally evaluated a 19th century barn loom here in Wisconsin that came with at least three “harnesses” consisting of a threaded reed (real reed, not metal) with two to four shafts (hand-tied string heddles) threaded to a particular pattern – two inches or so of fabric coming out of the reed to identify the cloth and tails hanging out of the shafts at the rear bound with overhand knots – long enough to tie onto a new warp. On each harness was a tag indicating the number of ends needed and grist of yarn best suited to use to recreate the fabric. Tandy and Charles Hersh in their “Rural PA German Weaving” also refer to such harnesses, called “gears”. They state that professional weavers owned between one and five – with one weaver documented with fifteen. So this concept of harness as shafts, reed, hanging cords and the threaded warp ends was familiar to American handweavers in the 19th Century. (Hersh, et al., 2001 pp. 31-2)

This harness – reed, shaft bars and heddles – is what will subsequently be referred to as the ground harness, containing the ground shafts. The pattern making device, separate from this ground harness, will be referred to as the pattern harness. The pattern harness need not be a full set of shafts on a drawloom – it can be much simpler.

Examples of harnesses stored off loom



Harnesses stored on a rack at Klassbols linen mill, Horred, Sweden.

The pattern is stored in the threaded heddles; the fabric density is stored in the reed.

These harnesses provide pattern storage similar to computer files stored for handlooms. The liftplan is on the computer and the other fabric components are kept with the harness.

Used to repeat popular patterns.

Figure 1



Similar harnesses for a handloom at the weaving studio in Geltow, Germany near Potsdam.

Ulla Schünemann, the owner, stores her standard fabrics this way to save time when setting up a loom.

The looms here are old and some of the reeds are still made of reed. The heddles are hand tied string heddles with metal eye inserts – long popular with German handweavers.

Figure 2

I. Weaving and Pattern Generation

Before understanding how double harness looms contribute to loom controlled patterning, it is important to consider how a textile – in its most basic form is but a collection of intersecting threads forming a cohesive structure. The most elementary weave structure – one warp, perpendicular to one weft in one color – is quite useful as a textile. The single color flat surface is most useful for utilitarian purposes – potato sacks, bed sheets, fabric for undergarments, or as a starting point for surface embellishments – stitching, dyeing, or appliqué. However, a weaver soon yearns to make the fabric more interesting. This is a discussion of the various methods of adding design elements to the fabric while still on the loom.

Color and Weave Patterning



Figure 4
Plain weave, natural linen



Figure 5
Satin weave, white with red stripes, wool on linen

Solid color plain weave is not terribly exciting. Adding color changes makes fabric more interesting. Rich patterning gives a textile complexity and eye appeal.

Weaving in its simplest form consists of a simple loom with a means to tension a warp and form two sheds – the natural shed in the case of the warp weighted loom, or the stick shed on backstrap or Navajo looms, and the pull shed usually formed by preparing a stick with continuous string heddles used to raise selected warp threads (in its simplest form, every other warp thread). The rigid heddle loom uses a specially crafted version of the continuous string heddle pull shed (holes) and stick shed (slots). Modern looms have shaft frames to hold individual heddles so that this simple loom would be a simple two-shaft loom with two treadles or levers (in the case of a table loom). The resulting plain weave is a useful, serviceable fabric – but without some intervention, lacking in pattern and/or contrast. Weavers are constantly seeking methods of producing pattern in textiles to make them more interesting.

Pickup Patterns

On the simple loom (two sheds for tabby), pattern can be produced by three methods – pickup, tapestry or knotted pile. Pickup uses a stick that selects certain warp threads for the shed – pattern weft is inserted and the next tabby is woven.

Pickup can be done on any type of loom. It is simple and effective – the unsophisticated rigid heddle loom offers rich patterning capability when a pickup stick is used. These two examples illustrate how the pattern can be applied whether across the full width of the fabric, or just in selected areas.

The linen piece is using leno. The upper row stretches across the full width while the smaller areas below form a staggered progression of pattern squares. The wool runner exhibits leno both with 2 and 3 thread twists accompanied by a small overshoot border in supplemental weft technique.

Pickup creates lovely supplemental patterning, but without the possibility of pattern storage it is very slow.



Figure 6
Linen runner with pickup leno and other openwork techniques.



Figure 7
Wool runner with pickup leno and pickup overshot

Tapestry – Pictorial Patterning

Tapestry is weft faced patterning that is a discontinuous weft. Discontinuous means simply that the weft yarn does not stretch from selvedge to selvedge. Each pick consists of several strands of yarn.



Figure 8
Above: Weft faced wool tapestry rug in Zapotec pattern.

Every time the color changes, a new weft thread must be inserted and using various tapestry joins, woven in such a way that there are no large openings or weak sport in the piece. Tapestry covers many types of weaving including the Aubusson tapestries of the Middle Ages, Navajo rugs, Turkish kilims, Zapotec bags and rugs. Fine details can be woven into the fabric. The color changes produced over the piece give lovely pictorial detail, but again, this is a very slow technique.

Knotted Pile – Pattern by Pixel

Knotted pile produces rich pattern (Persian rugs) but is also very slow with limited uses for the textile produced. Here the loom is warped with a dense warp and knots are formed around pairs of warp with 2 or more wefts placed between each row of knots.

This is truly pixelated designing for woven fabric. Each knot represents a pixel in the design. When fine yarns are employed, incredible details can be woven into the piece while on the loom.

As it is a pile weave, there are limitation to how such a fabric can be utilized – even though very short pile is possible, this does not make something suitable for clothing or other uses where smoothness and drape are needed attributes.

Hardware Needs by Device Type

Pickup and Weaving Sword

Hardware needed:

Countershed loom

Long eye heddles

Pickup stick

Weaving sword

Thin sticks, dowels or rods to store pattern – 1 stick per pattern row (not pictured)

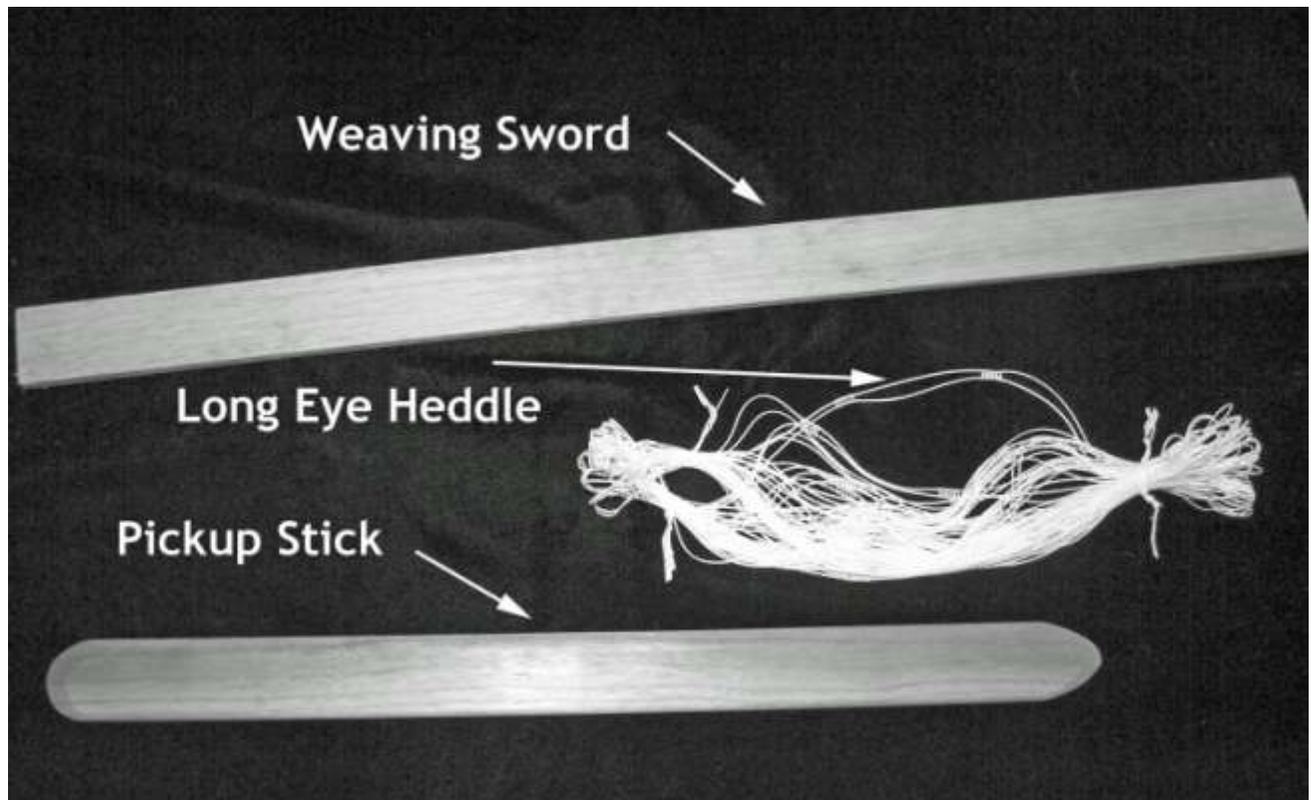


Figure 63

This is all that is needed to do double harness supplemental weft patterning (Opphämta). Even a small counterbalance loom will be sufficiently deep to weave well.

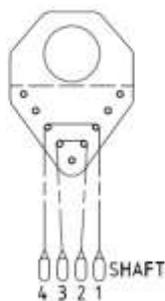


Figure 64

If pickup is desired to weave simple damasks, either counterweights or elastics need to be mounted along with damask pulleys. See Figure 40, Figure 41, Figure 42, Figure 43.

With pickup damask, the depth of the loom does affect ease of weaving. A simple back beam extension will make performance much better.

Designing for Damasks

First, let's remember the definition of damask from the Basic Terms page:

" **Damask** – A self-patterned weave with one warp and one weft in which the pattern is formed by a contrast of binding systems. In its classic form it is reversible, and the contrast is produced by the use of the warp and weft faces of the same weave, usually satin. By extension this term is also used for weaves in which two distinct binding systems are employed."

Block Designs for Drall Weaves with More than Three Blocks

We all see the block designs in the older weaving books – referred to as Drall or Diaper. These are basically geometries for intricate block designs. Usually there is no threading and treadling associated with them as they were meant to be “translated” to a structure and its associated threading and tieup and treadling.

The very simple two-block designs can be done on any normal loom with six or more ground shafts (turned 2/1 twill). Three blocks would need at least 9 shafts – or 15 if turned 5-end satin were used. Some of the more complex patterns from Kirschbaum or Frickinger had five to eight blocks.

With the drawloom, it is very easy to associate each block with a group of drawcords or one or more pattern shafts and weave this with only the number of ground shafts needed for the basic structure – e.g. 5 ground shafts for 5-end satin. The pattern squares for each block are then spread out using one or more pattern shafts per block (too many lingos on one pattern shaft make for difficult lifting). On the single unit drawloom, just one lash per block is the minimum, but if too many leashes are included in the lash, the lifting will also be heavy.

Borders and other breaks in the block pattern can also be added simply.

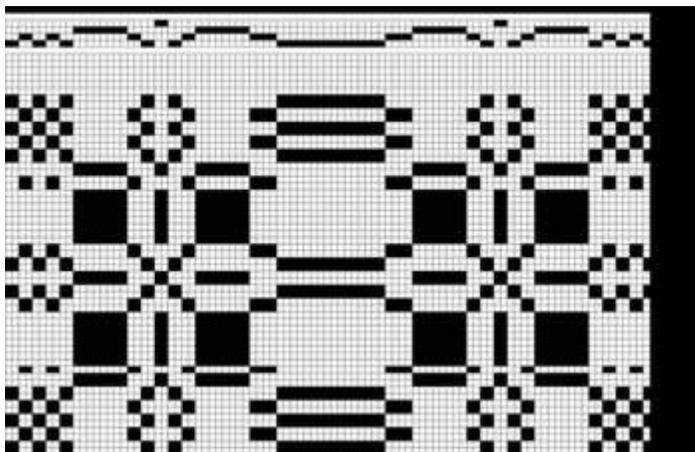


Figure 161

A three block drall damask, using just 3 pattern shafts. Note how many lingos are needed on pattern shaft one. Either the use of half heddles or a weighted bar is called for rather than individual lingos. For the pattern shaft drawloom, the pattern needs to be spread on a larger number of pattern shafts or a single unit drawloom can be used.

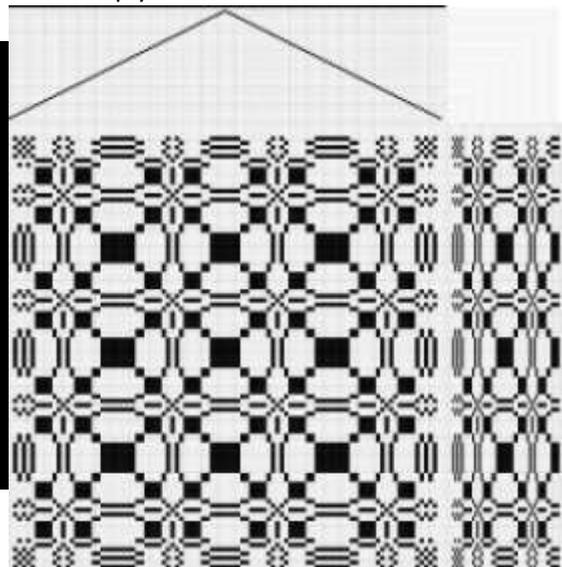


Figure 162

The same three block design spread out on 50 pattern shafts, each pattern square using two leashes, so that each pattern shaft lifts only four leashes. This also makes it easier for the weaver to work other patterns – similar or totally unrelated on the same warp.

Configuring Pattern Shafts

This section is primarily for owners of pattern shaft drawlooms. The “threading” or placement of leashes on the pattern shafts corresponds to threading any multi-shaft loom. The two simplest threading straight draw and point threading give the weaver many possibilities. Shaft draw systems usually have between 10 and 100 pattern shafts. The modern draw attachments, such as Myrehed or Öxabäck have 40 or 50 as a midrange option. It is definitely NOT necessary to mount all pattern shafts for every project. Once the drawloom has been assembled, it is usual to leave all the pulls mounted and functional, yet design patterns that do not need the full complement of shafts. Similarly, if a design needs fewer than ten additional pattern shafts, it is possible to rig up a few single cords to leashes and draw them from the front of the loom.

Leashes on pattern shafts do not need to be placed in straight sequential or mirrored point arrangement. As with designing complex threadings for weave structures, the pattern shaft arrangement becomes a unique design tool.

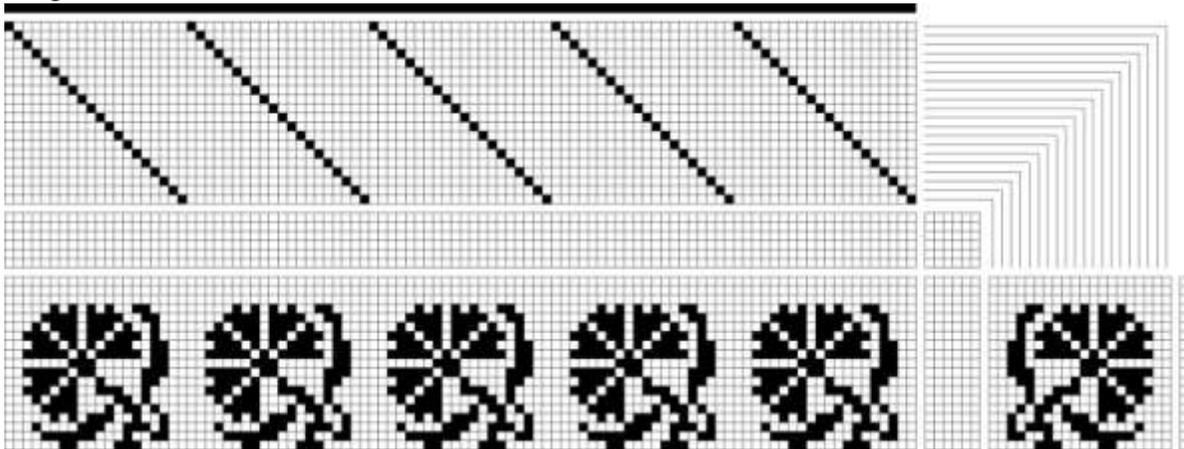


Figure 163

Here we have the basic carnation pattern with a straight arrangement on twenty pattern shafts. Note that all carnations face the same way. The pattern is drawn by pulling each row with a combination of 20 wooden pulls - prescribed by the liftplan.

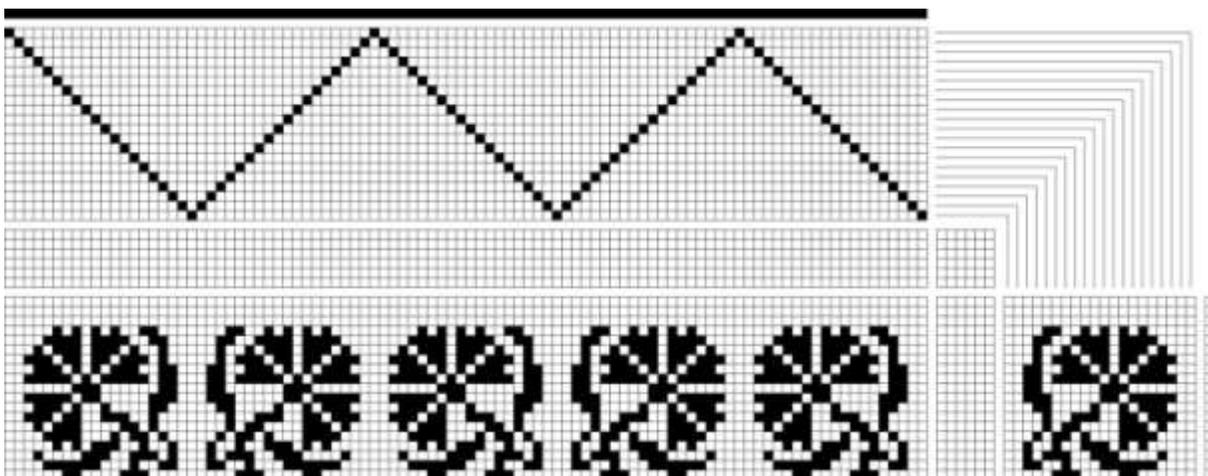


Figure 164

Now a point arrangement of pattern shaft leashes. Note that the carnations now alternate their direction, adding something new to the design. The liftplan remains the same.

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Double harness weaving techniques are ancient and beautiful. A weaver is able to place carefully crafted patterns anywhere on the surface of a textile in ways not always possible with loom controlled patterns on multi-shaft looms. Double harness techniques can be executed on both simple looms and elaborate drawlooms. Double harness weaving opens up many possibilities to form a wide array of creative structures and unique textiles.

The purpose of this book is to fill a void. There has never been a comprehensive work in English that included several types of double harness looms and their operation. Rather than a collection of projects and patterns, this book is meant as a guide to either acquiring a drawloom or modifying an existing loom to do double harness patterns when desired. The section on designing is meant to provide weavers with tools to create interesting textiles on their own.

Sara von Tresckow has been weaving since the late 1970's, first in Germany, and since 1990 in Wisconsin. Her venture into drawloom weaving began in 2003. She and her husband Hans are owners of The Woolgatherers, Fond du Lac, Wisconsin - a complete fiber shop for spinners, weavers and fiber artists. Sara teaches and weaves using the shop as a studio. Hans builds small looms, repairs spinning wheels and creates spinning stools well known for their comfortable nature.

