My Re-Education on Counterbalanced Looms

by Deborah Chandler

We were half joking. But only half.

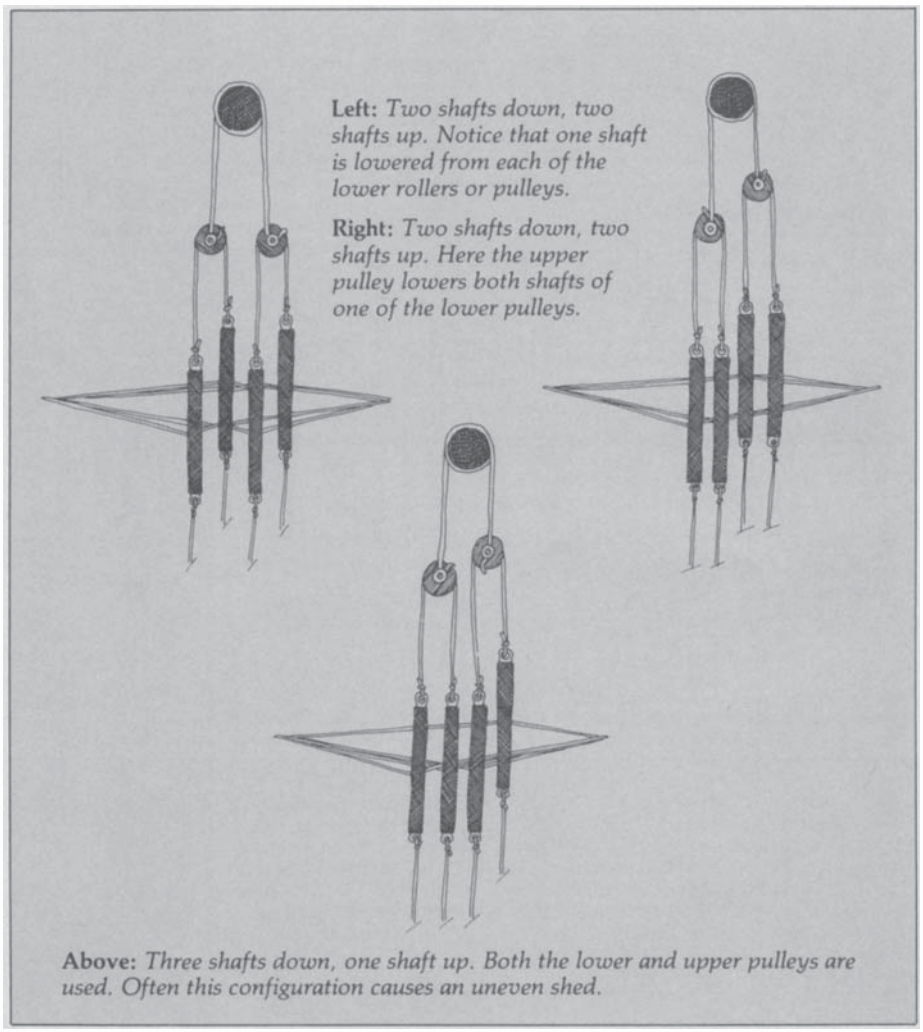
"So what you're telling me is that you are faster than gravity?"

She thought for a second or two and replied, "Yes, I am faster than gravity. Actually, I weave about 32 picks per minute."

I was at The Mannings, in East Berlin, Pennsylvania. The conversation took place with Mary Ann Geldmeier, who has been teaching there longer than I've been weaving. It's possible that Mary Ann knows more about counterbalanced looms than anyone in the country, and certainly she knows as much as anyone. It seemed like the time for me to get some real information about them, to find out what they *can* do instead of automatically accepting the commonly held beliefs of what they *can't* do. (The only American besides Mary Ann I've known to give good press to counterbalanced looms is Rachel Brown of Taos, New Mexico. In her book *The Weaving, Spinning, and Dyeing Book*, Rachel has a good section on the strengths and weaknesses of the three types of harness looms: counterbalanced, countermarch, and jack.)

So what did I learn? What does faster than gravity mean? What were my misconceptions before?

Counterbalanced looms are built with two shafts hanging opposite each other over a roller. Shaft one hangs opposite shaft two, shaft three and four hang opposite each other, and then, using a third and higher roller, the first two are paired against the last two (see illustration). These looms are called counterbalanced because the shafts are counterbalanced, working against each other.



Left: *Two shafts down, two shafts up. Notice that one shaft is lowered from each of the lower rollers or pulleys.*

Right: *Two shafts down, two shafts up. Here the upper pulley lowers both shafts of one of the lower pulleys.*

Above: *Three shafts down, one shaft up. Both the lower and upper pulleys are used. Often this configuration causes an uneven shed.*

Counterbalanced looms have what is called a sinking shed. The treadles are often tied directly to the shafts, so when a treadle is lowered, the shaft tied to it is pulled down, and the threads lower, or sink. (On some counterbalanced looms the treadles are tied up to lams which are connected to the shafts.)

On a counterbalanced loom, when one shaft is lowered, the opposite shaft is pulled up as the roller turns. With four shafts, two are pulled down and two rise. For maximum advantage, the two shafts are used at a time, so the most common tie-up for a counterbalanced loom is 1&2, 2&3, 3&4, 4&1, and two more with 1&3 and 2&4.

Because of the counterbalanced nature of this loom, American weavers have, for the most part, dismissed many weaves as being beyond the capability of this loom. Traditionally the counterbalanced loom was designed for plain weave, 2/2 twills, overshot, and summer and winter (weaving only one block at a time). The view that double weave, 1/3 and 3/1 twills, honeycomb or lace weaves can't be woven on this loom is not entirely true. It is true that some adjustments in treadling may need to be made, but most often the weaver can compensate for what might appear as a loom deficiency.

The biggest surprise I got at The Mannings was that they use a direct tie-up on their counterbalanced looms: shaft 1 to treadle 1, 2 to 2, 3 to 3, 4 to 4. Then they use both feet to weave, stepping on one, two, or three treadles as necessary. When someone steps on three treadles, the shed wants to be uneven because of how the counterbalancing works. So to even it up, the weaver simply adjusts her feet a little, so the treadles are uneven and the shafts are then even. It's so simple. (When stepping on only one treadle, I found it necessary to even the shafts by hand, which was simply a matter of reaching in and leveling them by laying my hand across the tops of the three that were rising.)

Even being told that the solution to the age-old "problem" (perhaps better labeled "misconception") is so simple, you might well be asking, "Why bother at all? Why not use a jack loom and avoid these adjustments altogether?" Good question. And there is a good answer too.

Counterbalanced looms have always had certain advantages. They have very smooth action, which is also very quiet. For those with leg or back problems, the ease of treadling on a counterbalanced loom can be a real blessing. This characteristic results from the rollers (from the counterweighting), and if you plan to weave for long stretches of time (even with healthy legs and back), it can make far better use of your stamina.

Another advantage has to do with the opening of the shed itself. The warp starts in a neutral position, and as the shed is opened, some threads are pulled down, the rest are pulled up. All are being *pulled* to where they are going. For sticky warps this is a huge help, for the threads are being forcibly separated, thus none will be able to "ride up" with the others, going where they aren't wanted. Warp-faced weaving, with its close setts, fuzzy warps that grab onto each other, bumpy, snaggly, and otherwise "friendly" warps that want to stick together—all these are easier to handle on a counterbalanced loom. (That's also true of countermarch looms, but that's another story.)

One last word of explanation. When an uneven shed (one shaft against three) is being made, the shed will be a little smaller than usual. That's fine, for counterbalanced looms have huge sheds to start out with, often five inches, and even if some spread is lost, they still have a bigger shed than many looms.

Now, I'm not suggesting you all rush out and buy counterbalanced looms. I am saying they are far more flexible than I thought, and if you have one, changing the tie-up may give you a lot of freedom you didn't know you had. (I suspect, though, that in America, the jack loom will always reign as king.)

I do want to emphasize that each type of loom has distinct advantages, and depending on the type of weaving you do, it may be well worth your while to check into all three—with someone sympathetic to each. You might be as surprised as I was.

Oh yes, and so what does "faster than gravity" mean? With a jack loom, we step on a treadle, then let it up, then step on another. It is gravity that returns the shafts to their place of rest, to a closed shed. On a counterbalanced loom, the shafts stay where they are until the weaver steps on different treadles. Mary Ann feels that she has more and faster control over her sheds, because they happen as a direct result of her foot action. They move as fast and as slowly as she does. She doesn't have to wait for gravity.

Pretty amazing woman, that Mary Ann. □

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AN OVERVIEW OF LOOM TYPES

Counterbalanced Looms

Counterbalanced looms have shafts that are balanced against each other over a series of rollers, pulleys, or levers (sometimes referred to as horses). Counterbalanced looms usually have a maximum of four shafts. When you lower shafts one and three, for example, two and four automatically go up. Likewise, when shafts one and two are lowered, three and four automatically go up. Counterbalance looms operate best when the same number of shafts are pulled down as go up. An unbalanced shed, one up and three down or vice versa, is possible, though certain looms will do this better than others.

Jack Looms

On jack looms each shaft operates independently. The jacking mechanism, which may be above or below the shafts, lifts the shafts selected. When shaft one (or any combination of shafts) is raised, all the rest remain at rest in a position below a straight horizontal line from beam to beam. The threads lay on the shuttle race and form the lower part of the shed. The lams of the jack loom are between the treadles and the jacks and facilitate the lifting of multiple shafts through the use of one treadle. Tying up a jack loom is very quick and easy.

Countermarch Looms

Countermarch looms have some of the features of both jack looms and counterbalanced looms. Though the tie-up is a little more complicated than either of the others, each shaft can operate independently as on the jack loom and the warp threads are pulled apart as on the counterbalanced looms. Usually there are two sets of lams between the treadles and the shafts, one for the shafts going up, the other for the remaining shafts, which are pulled down.