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THE BEST LOOM.

Whenever two weavers come together there is always the same topic of conversation: looms. And unvariably beginners ask the same question: which is the best loom? And not only beginners.

Well, is there such a thing as "the best loom"? I doubt it. We are still in the stage of building looms based on old models used for centuries in industrial weaving and highly specialised. They all have been designed for one particular purpose, and every one of them is "the best" for this particular purpose. But what we want is a loom which could be used for everything, and which could be re-set from one weave to another with minimum of effort and in the shortest time. Then we would like it to be light, portable, and easy in operation. So far not a single model on the market even remotely resembles this ideal. And probably none will for quite a long while.

The difficulty is that many of our requirements are contradictory. A loom easy to set up will be heavy to operate. If it is light in weight it will not be steady, and if it is simple it will have rather limited use.

Perhaps in a not too remote future we shall have looms with small electronic brains, where a draft for threading will be prepared on a small perforated card, and the loom will do the rest. There is already on the market a small power loom with electromagnetic control for 24 heddle-frames and as many "treadles". The weave is plotted on a perforated board with 576 holes. The threading is done once for ever and the warp may be of "any" length. The 20" model is still rather expensive (about \$ 5.000 with accessories), but even if it was cheaper I doubt whether any real craftsman would enjoy working on it.

Among all hand looms the single tie-up jack-type is the most universal. It can be used with any number of frames, the tie-up is not only simple but does not require accurate adjustment, and ties of standard length can be used. If built for narrow warps it is not too heavy in operation. But it is a hopeless proposition when economy of time and effort comes into consideration. If it is "universal" the weight of heddle-frames must be such as to meet all emergencies, which means much too heavy for ordinary weaving. If they are only reasonably heavy the loom will be useless for very unbalanced tie-ups (such as spot weaves on 12 frames) and for very sticky or very closely set warps. If it is a large model it will be unreasonably heavy in operation for narrow warps, regardless of the weave used.

This is because these looms were designed originally for production, and only one type of weave and only one width of fabric were woven on each loom. If the weave was for instance spot-lace then the first frame was weighted much more than any other, the second was lighter, and the remaining "spotting leaves" were still lighter. But even under the best circumstances not much speed can be developed because the frames descend only by the gravity, and gravity means time. Poorly designed looms of this kind with too slender jacks, and elastic cords have still another drawback: they oscillate before settling in their lowest position which means that the weaver has to wait until they do so. The remedy: strong jacks and lamms, and only linen cords. When pulleys replace jacks, at least one source of trouble is removed, but another: friction, is introduced. Ball bearings can reduce friction but then they are expensive.

Another universal or nearly so loom is the double-tie-up jack-type (Swedish, countermarche etc). Here the heddle-frames are not weighted, so that the loom is much lighter in operation; they do not descend by gravity but are pulled down by the cords tied to the short lamms, so that higher speed of weaving can be achieved. Any shed will open regardless of the unbalanced tie-up, stickiness of the warp, or its close sett. A narrow warp can be woven on a wide loom without any difficulty. Besides these it has all the advantages of a single tie-up loom, except one: the tie-up. Not only that it has at least twice as many ties as any other loom, but half of these ties must be carefully adjusted, and really all of them should be carefully adjusted for a good performance. This means 48 ties or more for 6 block lace, and 160 ties for 12-frame twill.

Here one may argue that the time lost in tying-up will be soon recovered in weaving, which as stated above is faster than on a single tie-up loom. It is true, but it is a poor consolation for a weaver who has to lie on his back for two hours under the loom with different parts of his anatomy going to sleep every few minutes.

So much about "universal" looms. Since they are not quite satisfactory, the best solution for a weaver is either to limit his activities to one line of weaving, or to have several looms, each for a different purpose. Both solutions come really to the same: selection of a loom best adapted to a particular technique, weave, or fabric.

Single tie-up jack-type if used at all, should have adjustable weights attached to each heddle-frame. These should be selected with regard to the threading draft (the more heddles on a particular frame, the more weight), the width of the warp (the wider - the heavier the frames), and to the physical properties of the warp. These looms should be used only when the cost of equipment is of primary importance, because a double-tie-up loom although more expensive is much more satisfactory, and if necessary it can be used as a single-tie-up. This is done by tying only long lamms, and weighting either the frames or the short lamms. Here the weights can be replaced by cheaper arrangement of springs (screen door springs) attached to the short lamms not too far from the hinged ends.

The pulling force can be regulated by stretching the springs more or less (fig.1). Whenever this is not satisfactory, the full double-tie-up will be used. Partial double tie-up may help also in cases when only some of

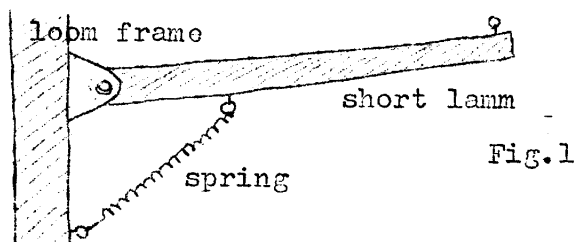
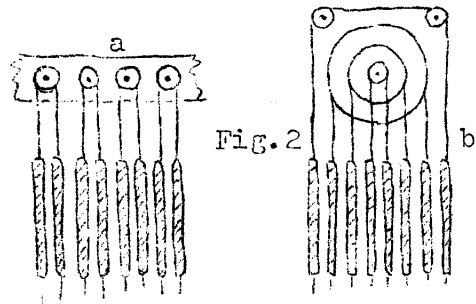


Fig.1

the sheds do not open properly.

Whenever there is question of four frame weaves, nothing can be as efficient, simple, light and fast in operation, as a counterbalanced loom. This is at its best with balanced tie-ups, but can be used with the unbalanced ones with a shed regulator (see the 1-st issue of MW) and even then it will be much superior to a jack-type, because the tie-up is simpler than in double-tie-up and the operation much lighter than in single-tie-up. With such weaves as lace, swivel, M's-and-O's, huck, honeycomb (waffle), and even cross weaves (leno) the speed of weaving is nearly the same as for tabby. With a very simple additional equipment two-block velvet (warp-pile weave), and multiblock chenille (twice woven rugs) can be made. With a little more elaborate attachment a counter-balanced loom can be converted into a draw-loom for such weaves as lace, spot, paper spot (dropped weave), embroidery (Dukagang) and swivel.

When more than four frames are required the counterbalanced loom is not as universal as with four. It can be used for instance for damasks and other turned twills (from 6 to 10 frames) on the condition that patterns are only two-block ones, and without ground, i.e. that the two blocks are not combined. Then the frames are hung in pairs (fig.2)



An efficient 6-frame arrangement has four frames hung in the usual way with a shed regulator, and additional two frames balanced separately. Such a harness will weave four-block lace (plus ground), swivel, huckaback, summer-and-winter (on opposites only), 2 block dimity (1:2 twill) and many other weaves, but not straight twills for instance. There are many variations of multiple-frame counterbalanced loom, but all of them are more or less specialised. What they have all in common is the speed of operation, and simplicity of the set-up.

Draw-looms give complete freedom of pattern, but unless a draw-boy (a helper) or a dobbie (or Jacquard machine) are available, they are much slower than straight multiharness looms. Then they are more bulky, much more expensive, and their "gating" or adjusting of the upper and lower tie-up takes much more time. Consequently they are hardly indicated for production which is supposed to be sold. They are economical only on very long warps when the length of cloth justifies a very involved tie-up (for the draw-boy) or punching the Jacquard cards. Otherwise they are excellent for the hobbyists. Needless to say that a draw-loom even at its worst is much faster than free weaving or pick-up method.

To the same class as the draw-loom belong two-harness looms. One harness of 4 or 5 frames weaves the ground, and another of any number of frames - the pattern. Compared with draw-loom they are much faster but they give much lower number of blocks in the pattern. The lower number of blocks - the faster the operation. With a draw-loom 160 blocks of pattern for 40 inches wide warp is about the lowest limit, when with two-harness method anything above 20 blocks is hardly practicable.

Then there is a class of looms which are automatic in a lower or higher degree. The simplest of these is the fly-shuttle loom, operated by hand and foot power. For a hobbyist a fly-shuttle is of little use, unless he has several looms, and needs one for wide fabrics. Weaving of such fabrics with fly-shuttle is superior both to double-width-cloth

and to "two-weavers" looms (looms on which two weavers work simultaneously).

Automatic take-up motion usually associated with fly-shuttle can be installed on any loom and then gives uniform beating regardless of the weaver's skill. If combined with flying shuttle, it is the nearest to the power loom. A fully automatic hand-loom has all this, plus an automatic beating equipment, so that the weaver operates only two treadles, and the loom does the rest. Obviously this last class does not interest a craftsman.

Frame looms, particularly large vertical models with a simple shedding motion, are a necessity for tapestry weaving. But small looms built on the same principle: box, cradle, board, etc. are good only for occupational therapy, or for nursery. Unfortunately table-looms are not much better. They may be used for sample making if they have a large number of heddle-frames and are strong enough to stand "heavy" beating. They should be as narrow as possible - 8 inches or so. Large table looms take as much space as foot-power looms, and cost only a little less. Their battens are always too light, and they are too slow to give any satisfaction to the weaver.

It is clear from the above that the weaver must specialise in one particular line, and then he can use one loom, or if he wants to be universal, he has to have several looms: one 4-frame counter-balanced with a shed regulator, one double-tie-up jack-type with as many frames as his pocketbook can stand, one draw-loom, and one tapestry loom. A narrow table loom for making samples will be optional. The jack-type should be built with several warp beams, two battens, and enough space on the batten for such attachments as bead-lamms for net weaves, or lappet frames for embroidery. All looms should have detachable shuttle-races, and they should be equipped with friction brakes on warp beams, and ratchets on cloth beams.

Warping equipment should consist of one frame for short warps, and a warping mill, or at least a horizontal warping reel for longer ones.

The above would be an ideal solution, but we have to make compromises, and it is up to us to select such an equipment, as to satisfy our requirements. As long as we do not expect one loom to have all merits, we won't be disappointed in our choice.

ERRATA:

In the 4-th issue of Master Weaver, page 11, line 17-th from the top, instead of "3, 4, 6, 7, 4, 5" should be: 3, 4, 6, 7, 6, 4, 4, 5.

On the same page, line 19-th: instead "only 7 figures", should be: "only 8 figures".

Please, correct the above mistakes and accept our apologies.
