CHAPTER 2

TOOLS AND ACCESSORIES

LOOMS USED BY THE HAND WEAVER vary in many respects. One of the important differences is the number of harnesses the loom has. There may be only two or as many as thirty or more. With each additional harness the pattern possibilities of the loom are increased decidedly.

► CHARACTERISTICS OF DIFFERENT LOOMS

Effective textiles may be created within the limitations imposed by a 2-harness loom. The addition of 2 more harnesses, however, enlarges the structural possibilities immeasurably. This especially applies to materials that can be made solely with the "thrown" shuttle. Recognition of this fact has made the 4-harness loom one of the most popular with weavers today.

Two types of hand looms in common use are the *counterbalanced* and the *jack type*. In the counterbalanced loom the harnesses operate in pairs—depress a treadle and one harness will be pulled downward while its companion rises in a counter action. With the jack type, each harness may be operated separately as an independent unit.

Since the counterbalanced loom employs a reciprocating action, it is a comparatively easy loom to treadle. The jack type, however, has an advantage with unbalanced weaves, those in which it is necessary to have 3 of the 4 harnesses tied to a single treadle, a combination needed for some lace weaves.

► CHOOSING A LOOM

These and other factors make the selection of a loom a perplexing problem for the beginner. Experienced weavers often hold widely

divergent views on the merits of looms, especially on the particular aspects of these two looms. Some looms are better adapted to certain types of weaving than others, and no one loom will be found to meet the exacting requirements of all. In schools or groups using more than one make or type, the beginner will have opportunity to see these in operation. This is information of a practical sort that will be helpful if he wishes to make an independent decision.

Important considerations with any loom are:

Quality of construction. It should be made of seasoned, kiln-dried hardwood to prevent warping and should be sturdy enough to withstand the impact of the constant beating during the weaving process.

Tie-ups. The cords, chains, or wires that connect the treadles to the lams should be of a type easily connected or disconnected; once connected they should be stable and should not stretch nor tangle.

Treadling ease. Whether the treadles are attached to the front or back of the loom is unimportant as long as they have sufficient leverage to permit easy operation.

Beater. This should be adjustable to accommodate different heights and lengths of reeds. A heavy beater is preferable to a light one, and is a necessity in rug weaving. Some weavers weight their beaters to give them extra force.

► PARTS OF A LOOM

It should be understood that these qualities are relative, and looms must be judged comparatively. Regardless of the selection, all floor looms have certain parts in common. These parts are illustrated in Figure 2.1 and include:

Frame. This supports two revolving members called the *warp beam* and the *cloth beam.* On the warp beam, located at the back of the loom, the warp is wound preparatory to weaving. The cloth beam at the front receives the fabric as weaving progresses. The diameter of the warp beam is important as a factor in maintaining warp tension. The larger the beam, the better, since it prevents excessive piling-up of warp yarns.

Harness. Technically speaking this includes the heddle frames, the lams, and the treadles—the mechanism which creates the shed. Most weavers, however, understand harness to mean the frame with attached heddles. The harness is suspended by means of cords or chains midway

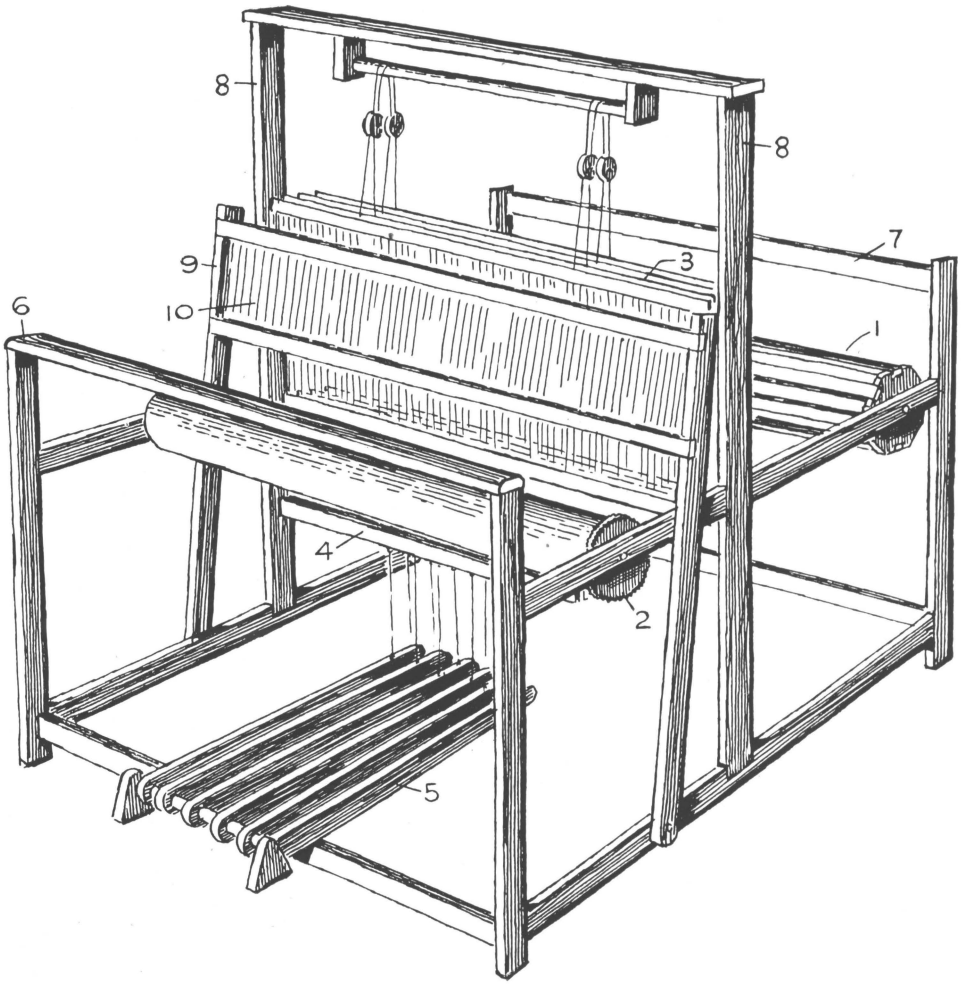
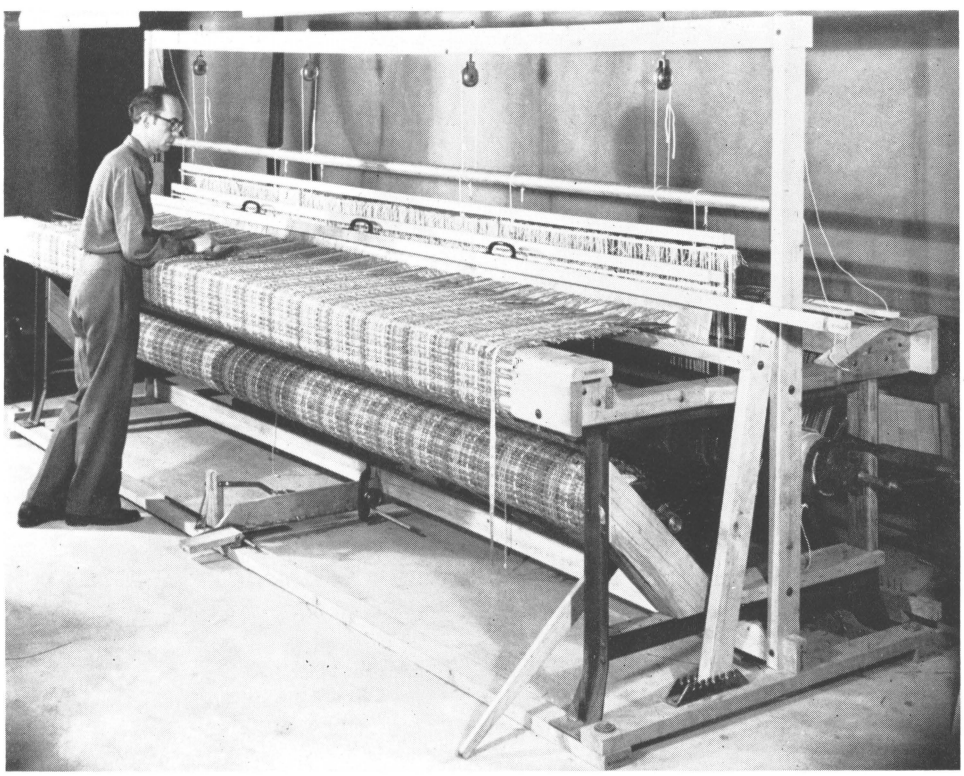


Fig. 2.1—Floor loom showing the important parts common to all looms. The first essential is a means of holding the warp yarns taut. This was accomplished by attaching the warp to the two bars in the primitive loom; by the warp beam (1) and the cloth beam (2) in the floor loom illustrated here. After being wound onto the warp beam (1) the warp passes up and over the back beam (7), then through the heddles and reed to the front of the loom. As weaving progresses, it is guided over the breast beam (6) and wound onto the cloth beam (2). Both the warp beam and cloth beam are equipped with ratchets for controlling the movement of the beams. The second essential is a method of separating the warp into sheds forming an opening for the passage of the shuttle. This mechanism includes the harnesses (3), the lams (4), and the treadles (5). The third important part of the loom is the beater or batten, shown here as the frame (9) which holds the reed (10) in place. The framework which supports the harnesses is shown in the side supports (8), connected by a beam across the top.

between the front and back of the loom. Individually, a harness may consist of either a frame or of two sticks, one placed directly above the other. They support the heddles, making it possible to elevate or depress selected sections of the warp in sequence, to achieve a given pattern structure. Harnesses are generally controlled by lams and these in turn are actuated by the treadles.

Heddles, illustrated in Figure 2.3, are suspended between the 2 harness sticks, with warp yarn threaded through the center eye. They may be made of stout cord, of wire, or of steel or aluminum strips. Wire heddles usually have larger eyes than flat heddles and, therefore, are more desirable if nubby yarns are used in the warp. When a variety of sizes and types of novelty yarns are combined, cord heddles are preferred. They have an advantage of large eyes that permit the yarns to pass easily and, being flexible, they cause less wear, abrasion, and breakage. Many weavers find them easier to thread.

Fig. 2.2—Loom with a 15-foot weaving width built to weave screens, wall dividers, and rugs. (Courtesy Sam Tushingham Studio.)



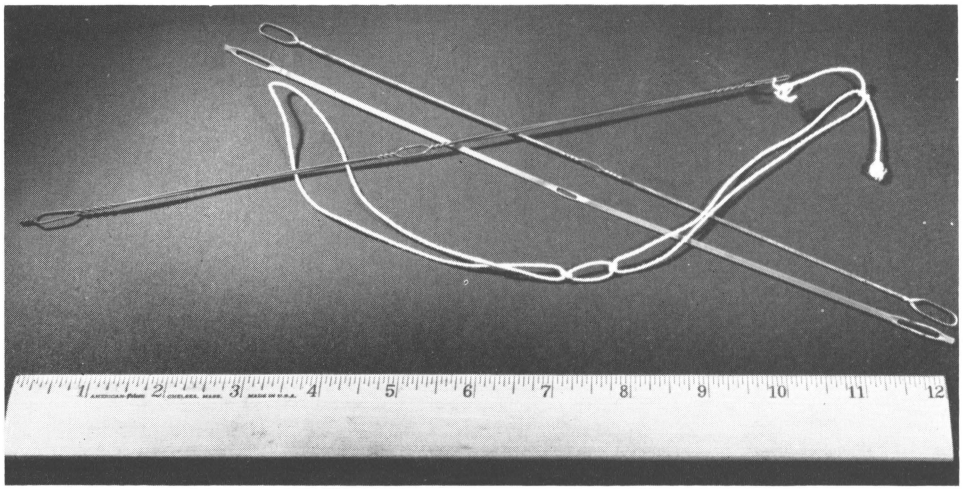


Fig. 2.3—Heddles of cord, twisted wire, flat steel, and aluminum. Not only do heddles vary in length but the size of the center eye or opening may vary. A larger opening is more desirable, and the wire heddles accommodate more variety of yarn sizes than do the flat metal ones.

Lams are the wooden arms found under, and parallel to, the heddle frames. They are attached to the loom framework on the left and are the connecting link between the harnesses and the treadles.* Lams make it possible to connect more than one harness to a treadle. Without them it would be necessary for the weaver to use both feet simultaneously to raise or lower two or more harnesses at the same time.

Treadles are the foot-controlled mechanisms that raise and lower the harnesses, creating the shed and controlling the warp yarns to effect the fabric structure the weaver desires.

A *beater,* or *batten,* is attached to the loom either at the base from which it pivots, or from an overhead framework where it is suspended to swing as a pendulum. This latter is termed an *overhead beater;* the former, a *floor beater.* The relative merits of these two systems is a subject of considerable controversy among certain groups of weavers. Either system, if well designed, will function satisfactorily. Preference generally results from long experience with one type or the other.

* They are attached to the harnesses by cords or wires at the exact center of the lower bar of the harness frame. Lam 1 is attached to Harness 1; Lam 2 to Harness 2, continuing in this order. Harnesses and lams may be numbered from front to back, or back to front, whichever the weaver chooses.

A *reed* is held in place by the beater, at the level of the warp. A reed consists of a metal frame that has a series of thin metal strips held parallel to each other, and equally spaced, throughout the length of the frame. Openings within this comblike device are called *dents*. Warp yarns are threaded through the dents to keep them in order, uniformly distributed throughout the width of the warp, and in proper position for weaving. When the weaver pulls the beater forward, the reed pushes the filling yarn into place, thus making the web, or cloth. Reeds are manufactured in many dent sizes. *Dent size* is determined by the number of openings per inch and may run from 4 to 40 or more. Contemporary weavers frequently use a range that extends from 6 to 15 openings per inch. Occasions may arise where it is desirable to thread more than one yarn to a dent, or thread in an irregular order, or even skip dents to achieve certain design effects. Reeds with fewer dents per inch permit greater latitude in the size of yarns used and in the arrangement of the warp ends. With a reed having many dents per inch the openings are proportionately smaller, therefore restricting its use to fine yarns.

► EQUIPMENT FOR MAKING A WARP

The usual equipment needed for preparing the warp includes:

Swift
Spool rack
Warping reel
Paddle

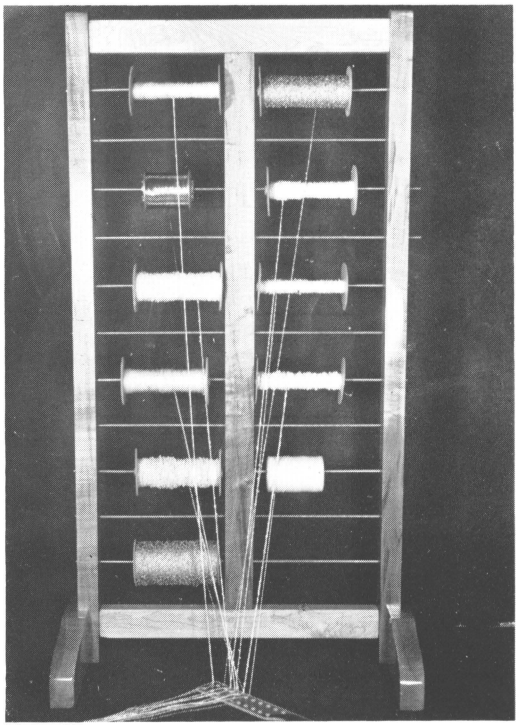
Weaving yarns are packaged in many forms: they may be in skeins or on cones, tubes, or spools, as in Figure 2.4, or other type of put-up. Yarn on cones, tubes, or spools generally presents no difficulties; it can be wound directly onto the warp reel, and a fairly constant tension can be maintained. Skein yarn, however, must be transferred to spools. The only exception would be when but one or two yarns are used in the warp and these both are in skein form; then they may be wound from the swift directly to the reel.

A *spool rack*, Figure 2.5, is a frame for holding the spools of yarn. It is an essential in keeping the yarns from tangling, and in retaining even tension. The metal rods on the rack shown are removable.

Two types of swifts are illustrated in Figure 2.6, the *umbrella* and the *floor swift*. Both incorporate adjustable features, to accommodate

Fig. 2.4—Yarns packaged on tubes, spools, cones, and in skeins. Note skein of chenille in background and white loop mohair at front. Linen tow yarn gives a dull texture to the tall spool, while the smooth white cone at left front is a mercerized cotton.

Fig. 2.5—Spool rack with spools of yarn in place and the paddle used in winding warps of four or more yarns.



various diameters of skeins, and they enable the weaver to keep the yarn taut so it may be unwound conveniently.

The preparation of a warp requires a *reel* or a *frame*. The reel shown in Figure 5.4 has a revolving section that consists of four uprights spaced 27 inches apart; one revolution would give 3 yards of warp. The pegs at the top and bottom are for starting the warp and making the cross. The pegs for making the cross may be either at the top or the bottom of the reel. The choice lies with the weaver. The cross is a separation of the warp yarns in an orderly sequence and is made by winding the yarns alternately over and under the pegs in the form of a figure eight. The separation of warp yarns is held in place on the loom by the lease sticks. This is to insure the proper arrangement of the warp as it is wound onto the warp beam and to facilitate the correct threading of the heddles. Three pegs are necessary if a warp is to be wound with a paddle, otherwise two are sufficient.

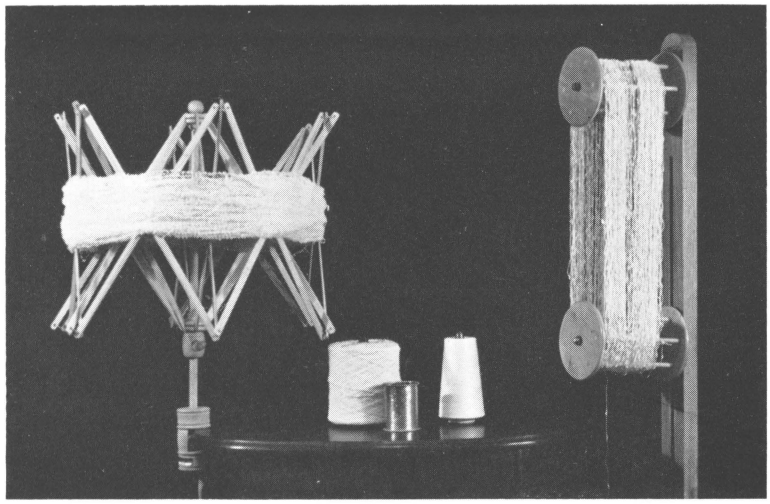


Fig. 2.6—Swifts, used for winding yarns from skeins. These can be the umbrella type like the one attached to the table, or the floor type at the right. In the floor swift the upper cylinder is stationary while the lower one is adjustable up or down. In the umbrella type the diagonal sticks are pushed up and out to fit a longer skein.

A typical *paddle* is shown in Figure 2.7. This is made of wood, metal, or plastic. It is used when more than five different yarns are employed as a warp unit and it is desired to wind them all at once. Otherwise it would be necessary to cut and tie the yarns to keep them in their proper sequence for threading. Many weavers use the paddle for winding fewer than five yarns.

A *stationary frame,* usually attached to the wall, is sometimes used for winding warps. The warp yarns are wound back and forth about a series of pegs, uniformly spaced to give an exact yardage. At the top of the frame are two additional pegs for making the cross.

► INSTALLING THE WARP ON THE LOOM

The following accessories are needed for this operation:

Spreader
Pair of lease sticks
Warp beam sticks
Reed hook

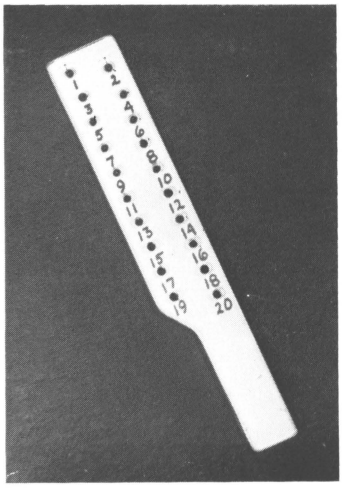


Fig. 2.7—The paddle used when winding warps of four or more yarns. Numbered holes show the order of threading the warp ends.

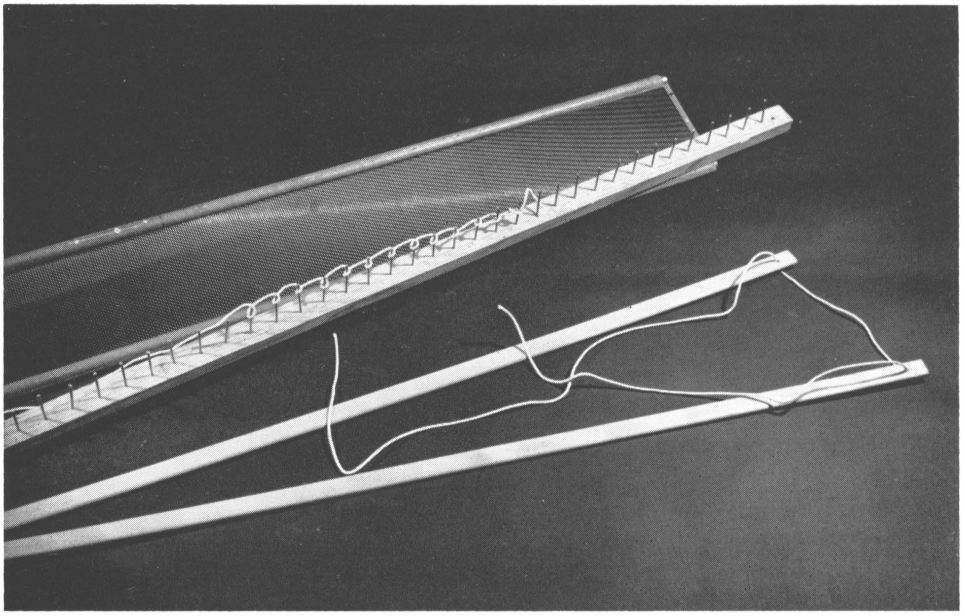


Fig. 2.8—A reed, a spreader, and a pair of lease sticks. A cord is laced around the nails to hold the warp in place. A stick or bar tied back of the nails could be used.

Before winding the warp onto the warp beam, the weaver must make some provision to see that the warp is spread out evenly to its full width. The *spreader* is usually used for this purpose. Like many loom accessories, it is a simple appliance and easy to make. Use a piece of 1″ × 3″ softwood, slightly longer than the width of the loom; drive No. 10 finishing nails one inch apart into the wide side of the wood, extending the entire length of the spreader. Prior to winding the warp on the beam, the spreader is placed in front of the loom uprights that support the harnesses. It rests on two sticks which have been placed inside and against the uprights and which extend from the breast beam to the back beam. These, together with the spreader, are tied securely to the uprights before making the warp distribution. The warp is then distributed within the 1-inch intervals of the spreader according to the number of ends per inch.

Resting on the same horizontal sticks that support the spreader are the *lease sticks*. Their purpose is to maintain the cross made at the time of winding the warp. After insertion in these openings on either side of the cross the lease sticks should be kept in place until the warp has been

threaded through the heddles and reed, and the warp has been checked for mistakes, then they may be removed.

Another group of sticks is placed between the layers of warp as the warp is wound onto the warp beam. These *warp beam sticks* are flat strips of wood, approximately ¼ inch thick and 1 to 1½ inches wide, cut the length of the warp beam and sanded smooth on all edges. In cutting these for length, make allowance for ratchet and pawl clearance; otherwise they will interfere in turning the warp beam. These sticks are inserted as the warp is wound on the beam. They prevent the warp yarns from piling up, and also help to maintain warp tension. With long warps, especially those having textured yarns, they should be used quite freely.

The *reed hook* is a flat metal hook, similar to a crochet hook that is used to pull the yarn through the reed.

► WEAVING ACCESSORIES

Once the warp is on the loom, the weaver needs certain accessories to do the actual weaving:

Shuttles
Bobbins
Bobbin winder
Tape measure, scissors, and other sewing accessories

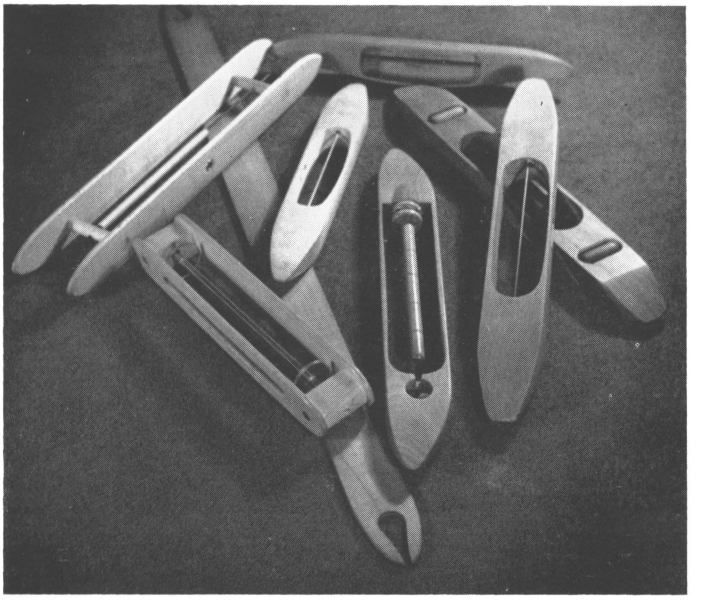


Fig. 2.9—A few of the many types and sizes of shuttles. At the extreme right, rollers in the bottom of the shuttle eliminate friction. The flat stick accommodates wefts too bulky or wiry to be wound in the usual manner. The shuttle in the center foreground uses a wooden bobbin. With the others, paper quills or spool-like bobbins of wood or plastic are used.

The type of *shuttle* selected by the weaver is determined largely by the material to be woven. Shuttles, which carry the filler yarn, are made in many sizes and shapes, as seen in Figure 2.9. Some, like tapestry shuttles, may be only 2 inches long; others, such as flat rug shuttles, may be more than 20 inches in length. Boat-type shuttles vary in length from 7 to 15 inches and have either an open or closed bottom. In some shuttles the yarn comes from an opening in the side, in others from the end. For fine filler yarns a small boat shuttle is often best. Heavy yarns call for a proportionately larger shuttle that has a large bobbin opening and an open bottom to take the maximum amount of yarn.

Rollers are sometimes recessed in the bottom of the shuttle to eliminate friction. Many weavers weight their shuttles to increase their speed as they pass through the shed. Sooner or later weavers develop individual preferences on such matters and frequently adapt shuttles to their own uses, or may design and make their own.

Bobbins usually are made of plastic, wood, or cardboard, though some weavers use soda straws or wrapping paper as bobbins. If paper is used, it is cut in an oval shape with the length slightly shorter than the shuttle opening. This paper form, or quill, is wrapped about the winder shaft near the end, then forced back on the tapered shaft until it is tight. While the weaver holds the paper tightly, the end of the filler yarn is inserted under the edge of the paper, the shaft turned a few times, and the winding proceeds.

Bobbin winders may be of the hand type or electric. An electric winder, shown in Figure 2.10, that combines two shafts—one for wind-

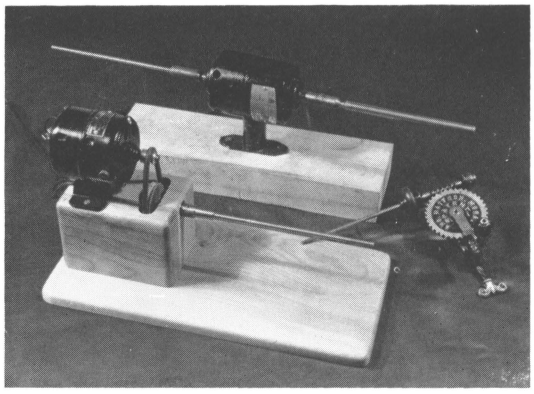


Fig. 2.10—Bobbin winders. For extensive work the weaver will find an electric winder a necessity. The one shown above has two metal shafts or mandrels, a large one at the right for winding spools and a small one at the left for bobbins. The lower winder has a tapering mandrel which serves both purposes. A Swedish hand winder is shown at right.

ing bobbins and the other for winding spools—is a decided asset to anyone doing a large amount of weaving. The electric winder has the advantage of allowing the weaver to use both hands in guiding the yarn. With the hand winder one hand must be used to turn the winder.

While the list of tools given here may be expanded, the beginner will find these essential and adequate. Many of them can be made by the weaver himself; further, he can incorporate his own ideas and make any improvements that might interest him.

It is well for the hand weaver to realize that the loom as we know it today has been developed over a long period of time by those using it and knowing its requirements. Many excellent looms are available. A good loom, one that works easily and efficiently, is absolutely necessary to produce a worthwhile fabric, and no hand weaver should be satisfied with less.