

Plain Braids, Braiders and Braiding

History—Classification of Products—Materials Used—Types of Stitchings

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Chapter I

The art of braiding or plaiting is older, perhaps, than any other form of interlacing and, in its rudimentary form was practised by hand from the earliest times by most primitive peoples.

The principle of braiding probably had its inception in the solution of the problem of effecting a satisfactory coiffure, and the further development, particularly of round braids, may have been promoted by a study of the Maypole dances of medieval times.

Barmen, Germany, is credited with being the birthplace of the commercial braid industry, and the business in that locality was already flourishing when, in 1748, the first official mention was made of a braiding machine, the occasion being the granting of a patent in Manchester, England, to one Thomas Walford.

Braiding was first introduced into the United States from Germany in 1824, and for a while Philadelphia was the home of the domestic industry. Rhode Island, however, soon forged to the lead, and for many years has enjoyed the distinction of being the center of the braid industry in the United States.

According to the biennial census of 1929, conducted by the Bureau of the Census, Department of Commerce, Washington, D. C., a partial list of braiding machines in the United States, both active and idle, and their geographical distribution is as follows:

Connecticut	9,986
Massachusetts	22,190
New Jersey	3,935
New York	12,561
North Carolina	1,064
Pennsylvania	16,081
Rhode Island	30,318
Virginia	300
Other States	11,340*

The foregoing list does not include the Woolen and Worsted Goods industry; the Electrical Machinery, Apparatus, and Supplies industry; or the Wire industry. The inclusion of these industries might easily augment the above figures by fifty per cent.

The distinctive feature of a braid is that there is essentially but one system of threads or strands, each of which crosses in a diagonal direction alternately over

* This figure includes braiders operating on special products in North Carolina and Rhode Island.

and under one or more companion threads passing in the opposite direction, thus producing a herringbone effect; whereas, even in the simplest form of weaving there are essentially two systems of threads, one of which (the warp) lies lengthwise of the fabric and is crossed at right angles by the other system (the filling).

In simple braids one or more threads are wound on a small spool or bobbin. A number of these bobbins are then grouped around and all of the strands from the several bobbins are gathered together to a common center where the interlacing is effected.

Braids are designated by the number of lines in width or circumference and the number of stitches per inch, and also, in some types, by the internal diameter, the external diameter, or the width in inches. Flat elastic braids are often specified by the number of cords or the number of rubber threads they contain. Each *line* in a regular braid comprises the space of four strands; each float of a strand on the face of a braid constitutes a *stitch*. The term *line* as here used must not be confused with the term *ligne*, which is often employed in the ribbon industry.

Figure 1 illustrates the method of interlacing a plain braid. At *A* is shown the space of one *line*; at *B* is shown the space of one *stitch*. The shaded portion represents one strand. The figure represents a regular 13-carrier flat braid.

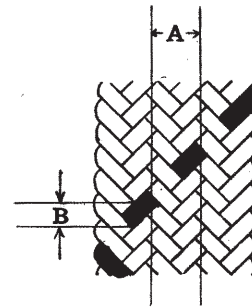


Fig. 1

Among familiar articles produced on plain braiding machines are clothes lines, fishing lines, shoe laces, shoe ribbons, corset laces, hangers for coats and sweaters, shoe threads, wickings, tubings, umbrella straps, suspender cords, tying tapes, jacquard lacing, picture cord, rug braids, hat braids, lingerie braids, bias braids, belts, suspenders, bumper cords, automobile loom (ignition assemblies), elastic braids for arm bands, garters and suspenders; telephone cords, sleeveings, and other cov-

erings for electric wires; spindle bandings and power beltings for delicate instruments; cords and shrouds for parachute and balloons, and rickrack braids and a host of other ornamental trimmings.

All kinds of materials are used in the manufacture of braids. Principal among these are cotton, wool, worsted, linen, flax, jute, hemp, spun silk, thrown silk, sewing silk, rayon (artificial silk), artificial straw, artificial horsehair, tinsel, lame (or lahn), wire, India rubber, and asbestos. Most of these materials may be used either in the single or plied, and many of them may be used in combination with others.

Classification

Braids may be roughly divided into two classes—Round Braids, and Flat Braids.

Round Braids

In regular round braids one-half the number of strands are rotated continuously in one direction along a serpentine carrier course or raceway, and interlace with the remaining half which are rotated along a serpentine carrier course in the opposite direction. The resultant fabric may be hollow or may encompass a core of almost any material. In jump ropes, for instance, the core may be cotton, hemp, jute, etc.; for electrical work one or more bare or rubber-covered wires may constitute the core. For elastic work the core may consist of one or more strands of bare or cotton-covered India rubber threads.

In a regular round braid the number of strands is equal to four times the number of lines.

Figure 2 illustrates a regular round, cotton braid.

Flat Braids

In regular flat braids each strand is rotated along a serpentine carrier course for a part of a circle, and then reverses and crosses its former course, interlacing in each direction with the strands passing in the opposite direction. The resulting fabric is flat and, ordinarily, of but one thickness. Longitudinal threads may be incorporated in the process of braiding for the purpose of ornamentation or for lending strength, firmness, or thickness to the material. Flat elastic braids are formed by the introduction of warp threads of India rubber.

In a regular flat braid the number of strands is equal to four times the number of lines, plus one.

Figure 3 illustrates a regular flat braid.

Types of Stitching

There are three common types of stitching. These are known as 1st, the plain or regular stitch; 2nd, the diamond or basket stitch; and 3rd, the Hercules stitch. The first two types may be effected on any regular

braiding machine employing four-horn gears. The Hercules stitch requires a different braider; viz, one employing regular six-horn gears.

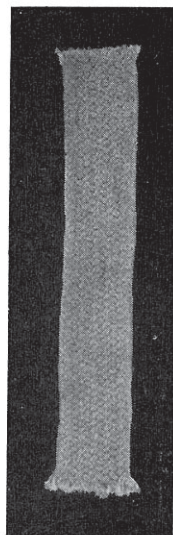


Fig. 2

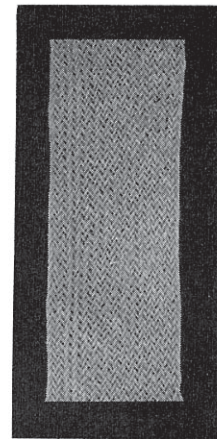


Fig. 3

In the plain or regular stitch each strand passes alternately over and under two other strands traveling in the opposite direction. Figure 1 illustrates a regular stitch as made on a 13-carrier flat braider.

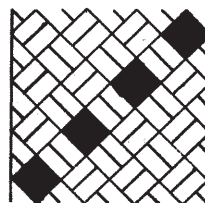


Fig. 4

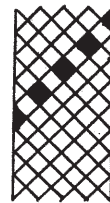


Fig. 5

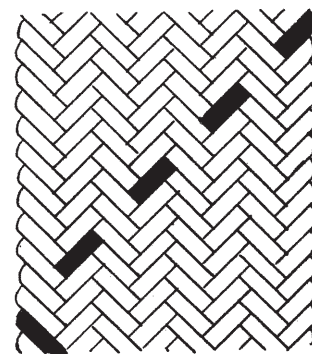


Fig. 6

In the diamond or basket stitch each strand crosses alternately over and under but one strand passing in the opposite direction; or the strands may interlace in pairs, each pair crossing alternately over and under one pair of strands passing in the opposite direction. Figure 4 illustrates the diamond stitch as produced on a regular 32-carrier round braider using the full complement of carriers. Figure 5 illustrates the diamond stitch as made on a 32-carrier round braider using but one half the full number of carrier, i.e., 16.

In the Hercules stitch each strand crosses alternately over and under three strands passing in the opposite direction. Figure 6 illustrates the Hercules stitch as made on a 25-carrier flat braider.