WEAVING.—No. XXII.

PILE WEAVING.

THIS class of weaving includes velvets, Brussels carpets, fustians, &c. It consists in the formation of loops on the surface of the cloth, and if the loops are cut through they form a brush-like surface to the cloth known as velvet or cut velvet. If the loops are left uncut, similar to the loops on Brussels carpets, then it is known as terry velvet.

The loops may be formed either by means of the warp threads or the weft threads, and they are called the pile threads.

The richest description of velvet made is known (with the exception of Dutch, Genoese, and specially made velvets) as "collar" velvet, for gentlemen's coats. The pile threads are of silk, but the weft is often of cotton, and velvets so woven are said to have cotton backs. Cotton makes the body of the cloth firmer and more suitable for the purpose than silk, so that the inferior material is not actually used on the score of economy alone.

Velvets of this kind are woven in hand looms of the ordinary description, as far as concerns the harness of the loom. But it is provided with two warp beams, one for the pile threads and one for the ground. The cloth beam is provided with a peculiar contrivance, for the velvet as it is woven must not be wound like ordinary cloth upon the beam or it would "lay" or crush the brush or pile threads. Consequently when the velvet has nearly completed one revolution of the beam the cloth is unfastened and again attached to the beam. As it is a very slow and tedious class of weaving, only about a yard a day being made, this unfastening of the cloth does not consume much time as it would do if repeated often.

Let Fig. 218, page 378, represent a section of a velvet loom showing all the working parts necessary, but omitting the framing. W is the ordinary warp beam supplying the threads for the body of the cloth. P is the "pole" (corruption of pile) or the pile beam which contains the pile threads. V is the cloth beam showing that it has made three-quarters of a revolution, and B is a closed box to contain the velvet as it is unwound from the beam. At T will be seen loops rising from the surface of the cloth, and at C the loops are shown cut through at their upper surface. These loops are made by inserting thin wires into the shed, which are beaten up with the cloth similar to ordinary weft threads. One of these wires is shown thus woven in the cloth at w, and at w^1 another wire is being inserted.

Now between each insertion of the wires three shoots of weft are thrown into the cloth, and well beaten together, otherwise the pile threads after they were cut would draw out. Fig. 219 shows a plan of Fig. 218, and the same letters and numbers refer to each. In the plan the wire w^1 is shown placed in the shed of the warp, and will be driven up by the reed R in the same manner as the wire w has been. When both wires have been firmly bound into the cloth by the weft threads, the first one is cut out by means of a knife fixed into a frame and called a "trevette," and it is again inserted. Thus only two wires are used, and they are cut out alternately by means of the trevette. The instrument is well suited for the purpose, and when it is considered that the wires are inserted from 50 to 60 times, and upwards, per inch in length of velvet woven, and three times that number of weft threads, it will be evident that great exactness of the operation is necessary, or the slightest error or carelessness would cut the warp threads out of the loom—a circumstance by no means unknown to most velvet weavers. The wires, which are made with a fine groove for the point of the knife to enter, are very truly made, and the blade of the trevette must be "as right as a trevette" —hence the well-known simile—or such beautiful work as velvet could not be produced.

Figs. 220 to 223 show the trevette. The knife k is fixed into a frame A. This frame is hinged to another frame B at the point h, so that the weaver can open and sharpen the knife easily. The knife is held firmly by the screw s, and at the back of the frame a small adjusting screw e is placed to regulate the distance of the knife from the steel frame B against which it is placed. See Figs. 222 and 223. The frame A is of brass, but all the rest is of steel. The indentions $x\,x\,x$ are for the fingers to fit in, a requisite precaution to insure accurate hold of the instrument.

The use of the trevette is shown in the enlarged sketch, Fig. 224, in which the knife edge is seen entering the wire w. B and C are the bottom portions of the trevette, and rest upon the warp and cloth as shown. The trevette is held in the right hand, and drawn from the left to right. It is pressed against the flat side of the outside wire w^1, which forms the guide or fence, and the knife is regulated to fall into the groove of the inside wire w. When upwards of sixty insertions of the wires per inch are made, an idea of the perfection of workmanship required for the purpose may be realised.

About six times in length of the pile threads are used to what are required for the "back," which, of course, arises from the formation of the loops. Much less strain is also put upon the pile threads by the use of smaller weights, as shown at b and b^1.

The wires, see w^1, Fig. 219, are slightly curved, for they are better in this form for the weaver to insert, for he glides them upon the convex side through the shed, and being curved also insures that the right side of the wire—the grooved edge —is always uppermost. The wires being only about $\frac{1}{20}$ in. deep, are easily driven straight by the reed. They are made of brass wire about the size of an ordinary pin, and recover their curvature after being driven straight by the reed.

Fig. 226 shows the cloth beam with one of the

many contrivances for holding the velvet. A large slot is cut in the beam, and three strong laths are placed into it. The middle lath *e* has a number of needle points, about ¼ in. apart, fixed through it, these points extending to the side laths *s s*, as shown in the figures. Now the velvet is pierced by these needle points and held fast, as may be noticed by tracing its course shown by the dotted lines and arrows.

After leaving the beam the velvet is hung up by means of pin hooks in the box B, Fig. 218, which keeps it free from injury. The warp and pile threads may be traced in the figures as well as the weft. The headles, Figs. 218 and 219, shown at H^1 and H^2, work the ground or warp threads by raising each half of the threads alternately as in plain weaving. The headle H^3 raises the pile threads at every fourth change.

Singular as it may appear, when the work is taken from the loom the weaver places it upon a table, and by means of a sharp common razor literally shaves or mows the whole surface of the pile, in order to remove any stray filaments of extra length and to improve the face of the cloth.

Fig. 225 shows a section of the velvet through the line of warp threads in which *s s* is the weft *w w* the ground or warp threads, and *p p* the pile. Fig. 224 is a section at the side of the cloth, and the letters refer to the same parts. In these figures the actual formation of the cloth is represented, excepting that the pile threads are usually made thicker or doubled.

Brussels and other pile carpets are made upon the same principle as the velvet above described, but generally the pile is not cut, consequently round wires are used instead of grooved ones, and they are drawn out from the side of the cloth.

There are two descriptions of carpets, one in which the pile threads have had the pattern printed upon them previous to weaving, and the other in which the threads are used dyed in separate colours. The first kind is known as tapestry carpets, and form a comparatively simple and cheap manufacture, when compared to Brussels carpets. Let Fig. 227 represent the warp and pile threads with the pattern printed upon the pile threads. The pile threads are marked *p p* and the ground threads *w w*, these lying between and under the pile threads. About five of these warp or ground threads are used to each strand of the pile, which may be seen in section Fig. 230. Now when the threads are woven together the pile is contracted to nearly one-third of its length in consequence of the loops, and the distorted figure, as printed, becomes of the intended proportion. Thus Fig. 227 becomes, when woven, Fig. 228.

A section of the cloth is shown in Fig. 229, and in all the figures, 227 to 230, the same letters refer to the same parts. The threads *c c* do not intersect with the weft, but merely lie between the warp threads *w w*, and form a bed or ground for the pile to rest upon. The wires used are generally six or more in number, for if only two were used the loops would scarcely resist the strain of drawing the wire, the greater number causing greater firmness to the cloth to resist the strain. Brussels carpet is a very different affair. A great variety of threads of different colours are required, and they are selected by the action of the Jacquard machine to form the pattern. They are wound upon separate bobbins, for each colour is used in various lengths.

Let Fig. 231 represent a section of a Brussels carpet. The threads *a a* are the warp threads, and *s s* the weft. Where there was only one thread in the tapestry carpet there are five in the Brussels; thus the pile threads are shown at *w w*, and as the various colours are required they are drawn to the surface to form the loops whilst four-fifths of them remain in the body of the cloth. The great number of pile threads, and their being of wool and not of hemp, as the warp and weft are, cause the Brussels carpet to be much thicker, the colours brighter, and altogether a superior carpet to the less costly tapestry, as the difference in price attests.

Many kinds of carpets and rugs are woven on the systems above described, but have the pile cut as in cut velvet weaving, such as Axminster and Wilton carpets.