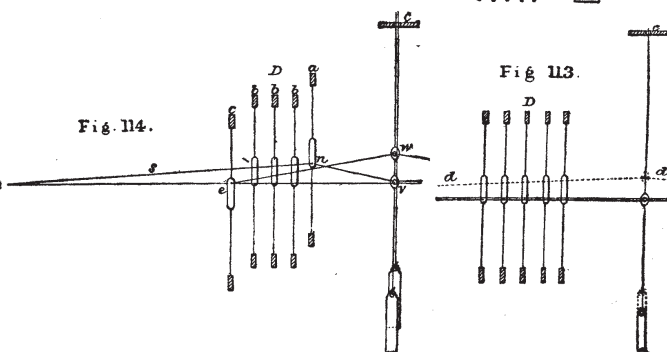
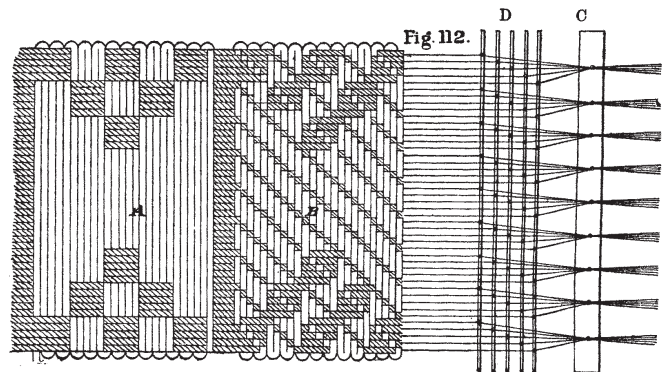
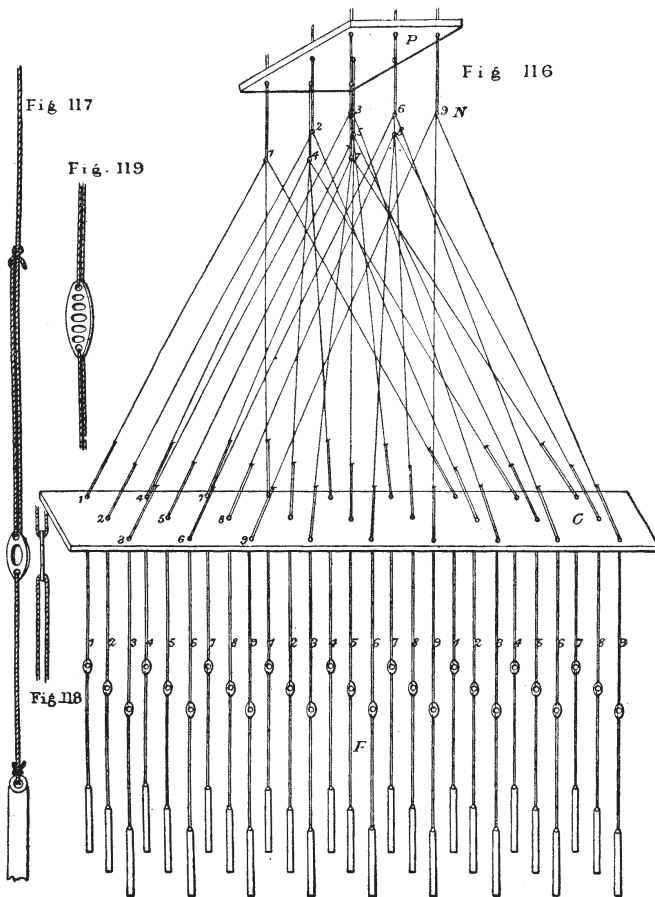
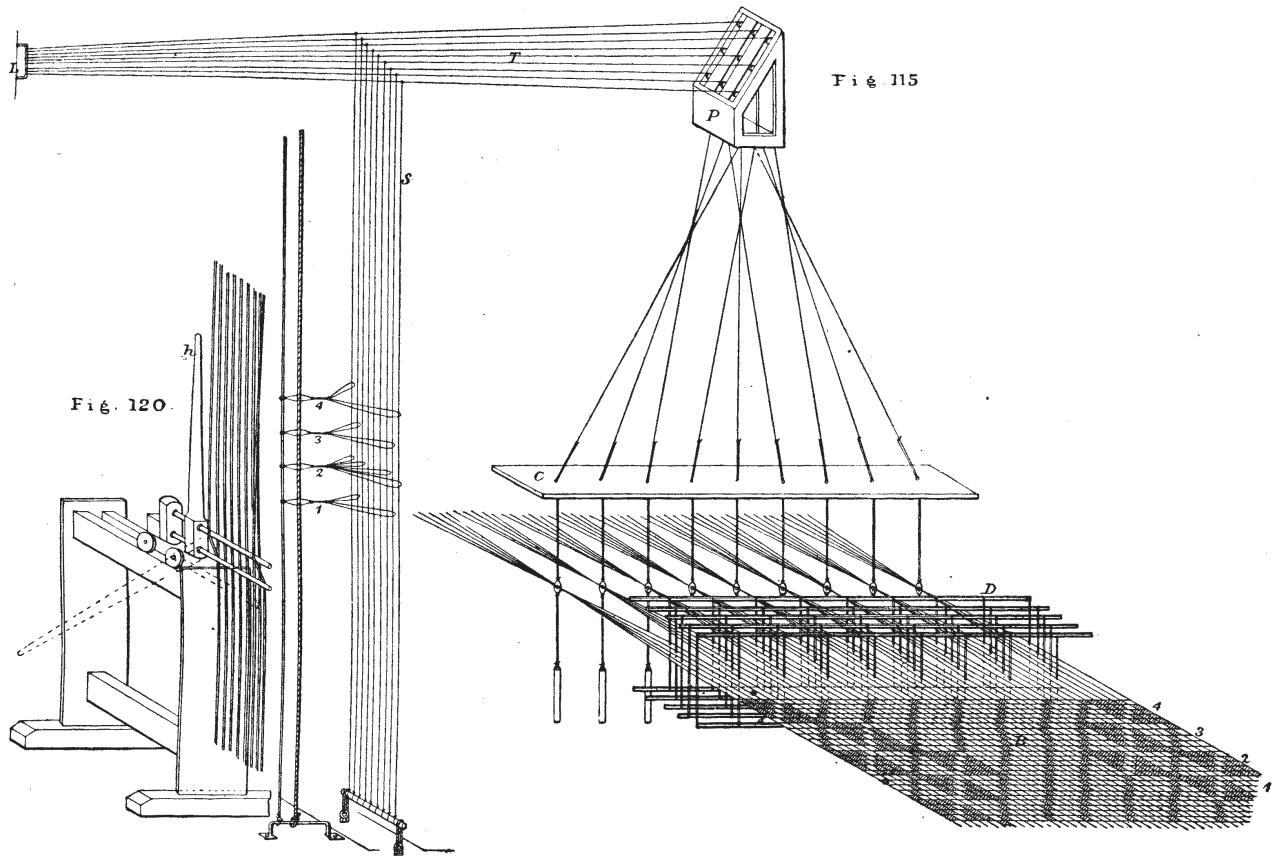


HAND-LOOM WEAVING: THE DRAW LOOM.



WEAVING.—No. XII.

THE third class of weaving, into which we divided the present part of the subject, consists in applying two separate systems of harness in the loom in such a manner that after the warp has been passed through one set it is passed through the second set, each set of harness having an especial duty to perform, although they both operate upon the same warp threads.

The first harness through which the warp passes is for the purpose of forming the pattern, as it were, on a large scale, and the purpose of the second harness is to break up this pattern into detail and complete the necessary minute intersections. In other words, in the first instance the outline of the pattern is formed, and the next case that outline is woven in detail, so that each thread is intersected, or woven together, as in twill or satin, of any desired description.

At A and B, Fig. 112, the process mentioned will be at once apparent. It will be seen that at A the figure woven consists of not less than five threads in both warp and weft between each intersection, and in some places the figure runs nearly across the cloth without any intersection of the weft threads whatever. Still the outline of the pattern is formed, and it now remains to form that outline into cloth of proper consistency, by giving the threads the requisite number of intersections for that purpose.

This is effected by passing the weft threads, in groups of five, in this instance, through the eyes of the healds at C, and thence through the healds at D, where they are distributed, each thread having a separate eye. The eyes in these healds are made of considerable length, as shown in section, Fig. 113, where it will be evident that the leash C may be raised and lift the warp threads with it, as shown by the dotted line *d d*, without being obstructed by the eyes in the healds D. Consequently, if the leashes C are worked separately, and without working the healds D, they would raise the threads in groups and form the cloth, as at A, Fig. 112.

Now we will suppose, on the other hand, that the healds C remain stationary, as in Fig. 113, it will then be seen that any of the healds D being raised will also raise the warp thread which passes through it. This is shown at *v*, Fig. 114, where the heald being raised has also raised one warp thread, although it is held down by the eye at *v* of the leash C, one thread being raised and four stationary. Again, if the leash C be raised, as at *w*, it will raise the warp threads quite independently of the healds D, but it will be observed at *e*, Fig. 114, the heald *c* being depressed has carried with it its corresponding warp thread, one thread being sunk and four raised of the five threads in the leash.

Thus it is clear that the healds C may be raised at pleasure, and form any figure that may be desired, as at A, Fig. 112, but by applying the ground harness, *i.e.*, that which works the ground or detail intersections of the cloth, the effect produced will be as shown at B in the same figure. In this case the ground is a single thread five-leaft twill, and is worked by a rising and sinking harness, as shown in Fig. 114. The twill is reversed, as shown in the light and dark parts at B, and by exposing, more or less, the warp or weft, thereby the design is rendered distinct.

This system of weaving is known as damask weaving, and was originally, it is believed, brought from Damascus, hence its name. It is said to have been introduced into England in the year 1567, during the persecutions by the Duke of Alva of the Dutch and Flemish weavers, who fled from their homes in consequence, and established that branch of weaving in various countries.

The loom in which damask weaving was effected is known as the draw loom, and, although there is perhaps no record known of its introduction into England, it is very probable that it was at the period above mentioned.

Fig. 115, on the preceding page, is a diagram of a draw loom, the same as shown in Fig. 112, and the letters in each refer to the same parts.

The leashes C pass through the holes in the comber board, as shown, for the purpose of keeping them in position, as before explained. They are then carried upwards, and through the bottom board of the pulley box P, and after passing over the pulleys are collected together at the staple L. From the pulley box to the staple the cords, shown at T, are called the tail of the harness. They are attached to another set of cords placed vertically at S. These cords form the "simple," and it is upon them that the pattern is arranged.

It will be observed that there are two strong cords placed vertically which form an attachment and a guide to a number of loops marked 1, 2, 3, 4. By drawing or pulling any of these knots of loops it draws with it the corresponding simple cords, and these being grasped by the hand and pulled or drawn downwards, they raise the corresponding leashes C, and thus the shed is opened in the warp so far as this part of the harness is concerned.

The leashes or loops on the simple S correspond with the leashes to be raised at C, and the corresponding numbers, shown at B, show their effect. For instance, the simple cords, 4, being drawn, they are held down until the healds D have been worked over, and the result is that the two extreme squares, B 4, at the edges of the cloth, are woven with four out of five of the warp threads raised, whilst in the intermediate squares the reverse effect is produced. On comparing Fig. 112 with Fig. 115 this effect will at once be evident.

In order to simplify the figure, only nine leashes have been shown in the diagram; as before stated, each leash really forms a heald of itself. But in actual weaving the pattern is repeated or arranged in some way to make the best effect with the least number of simple and tail cords. Fig. 116 shows the same arrangement as in Fig. 115, but it will be observed that the leashes are repeated three times over. The leashes, instead of coming down singly from the pulley box P, are connected together at N, and thence are passed through the holes in the comber board C, in the manner shown. The holes are placed diagonally in the board, so that equal spaces on plan for the warp threads may be secured, as shown vertically at F.

Fig. 117 shows a leash and weight or lingo attached, also the metallic, or glass, mail or eye; Fig. 118 is a corresponding side view. Fig. 119 shows a mail pierced with several eyes. This form of mail is necessary when several threads are passed through one mail. If the threads were all threaded through one eye they could scarcely be woven, but would get twisted and frayed by the working of the front or ground harness, and the obstruction would prove of the greatest disadvantage. Therefore it is usual, when several threads are used in one mail, to adopt the plan shown.